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COMPUTERWORLD

You can look; just can't buy

BY PATRICIA KEEFE
CW STAFF

LAS VEGAS — Comdex/Fall '91 has succumbed to the spirit of Las Vegas. Attendees at this year's extravaganza can expect to be teased up and down the strip by a parade of products that, for all their flash, aren't quite ready to deliver.

Topping the list of empty come-ons are IBM's OS/2 2.0, Microsoft Corp.'s Windows 3.1 and Word for Windows and Wordperfect Corp.'s namesake Windows word processor. On the hardware side, a slew of pen-based systems and color notebooks will make their presence known, but they too will remain inaccessible until at least early 1992.

The biggest disappointment for many users will be IBM's inability to ship the 32-bit version of OS/2 by year's end, as vowed back in April in a week-long, promise-filled statement of direction on the beleaguered operating system.

IBM will face an ensemble of press, resellers and customers at 3 p.m. today, when it is expected to detail the reasons behind the roughly three-month delay in the release of OS/2 2.0 (see story at right).

Microsoft will not have long

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COMDEX/Fall'91

Highlights of the show:

- IBM cuts price tags, adds PS/2 upgrade boards. Page 4.
- Multimedia gets boost. Page 4.
- Apple expands Macintosh line. Page 146.
- New notebooks rely on scarce chip. Page 146.
- Dell colors notebooks. Page 146.
- A few high-tech snippets. Page 147

Special Product Spotlight:

- New and recent PC enhancements for the power hungry. Page 101.

IBM: Basic OS/2 2.0 to ship by year's end

Move expected to bolster battered credibility

BY PATRICIA KEEFE
and CAROL HILDEBRAND
CW STAFF

LAS VEGAS — Is OS/2 dead? It was beginning to look that way, especially after IBM announced a three-month delay in general delivery of Release 2.0.

However, the company's sagging credibility got a badly needed boost last week when it promised to honor commitments to deliver OS/2 2.0 to users who need it by year's end.

IBM's Reiswig *promises limited year-end delivery*

In an interview last week, top IBM OS/2 executives outlined their reasons for delaying the expected year-end release of OS/2, and also addressed user concerns and industry criticisms.

Users who have bet large, critical projects on the delivery of the 32-bit OS/2 2.0 will not be left hanging by IBM. Lee Reiswig, assistant general manager for programming at IBM Personal Systems, said IBM will roll out OS/2 in December for the "small number" of users who must have it. Details of the rollout are still being worked out.

They will get only the "base-level" functionality promised at an April briefing, including the ability to run Microsoft Corp. Windows applications in standard mode on a full screen.

Reiswig and Joseph Guglielmi, general manager of marketing and business development for IBM Personal Systems, maintained that customers approve of the delay.

"It doesn't hurt nearly as much as delivering a buggy product on time," said Bob Holmes, a computer analyst at Southern California Gas Co. in Los Angeles. "That would destroy what little credibility IBM has left on OS/2."

Many users insisted that OS/2's vaunted technical super-

Continued on page 149

Users weigh costs to build Warehouse

BY ROSEMARY HAMILTON
CW STAFF

While some customers applaud IBM's Information Warehouse strategy, others claim it offers little more than their own internal efforts to better control the management and delivery of data.

Yet they all agree on one thing: IBM's Information Warehouse requires a lot of spadework.

Users and analysts contend that the job of setting up a warehouse, which provides access to data throughout a corporation, means a lot more than installing access tools. The up-front task of organizing the data to be stored in the warehouse could be time-consuming and costly, especially if a site has not been diligent in maintaining clean data all along.

Continued on page 6

Vendors make connections

Integration, teamwork highlighted at Networld

BY ELISABETH HORWITT
and JIM NASH
CW STAFF

DALLAS — The era of universal connectivity and open systems may still be a long way off, but attendees at last week's Networld '91 show were heartened by a spate of new alliances between network industry rivals in the name of multivendor integration.

"Kicking and screaming or not, major vendors have finally conceded that they cannot supply all of their customers' computing and networking needs," said Elaine Bond, chief technology officer and vice president at Chase Manhattan Bank NA.

IBM, Banyan Systems, Inc., Microsoft Corp. and Apple Computer, Inc. were among the major vendors that announced they were integrating their networking environments with those of

Continued on page 149

DEC restarts stalled mainframe strategy

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Disappointing sales and changing customer needs have spurred Digital Equipment Corp. into a major overhaul of the strategy behind its VAX 9000 mainframe line, company officials said last week.

On Oct. 30, DEC plans to lay out initial details on the next three mainframe systems slated for delivery in 1992-1993, as well as on the upgrade path to the Alpha VAX mainframe. Current users of VAX 9000s will be offered substantial discounts and upgrade deals to move them to the new mainframes, said Richard Whitman, manager of DEC's mainframe line.

Meanwhile, in hopes of boosting sales immediately, DEC last week announced price cuts of up to 30% on its VAX 9000 servers, and server software prices were cut by up to 38%.

The company has also reorganized its mainframe business unit, now dubbed Production Systems Business Unit, and is shift-

Continued on page 12

Moving on up

DEC's revamped VAX 9000 strategy includes the following:

- Three VAX 9000s to be introduced between early 1992 and the late 1993 debut of the RISC-based Alpha VAX mainframe.
- A change in the underlying chip technology that cuts DEC's costs and improves price/performance.
- A reorganization of its mainframe business unit that places greater emphasis on systems software.

INSIDE

Satisfaction slips

250 users gave lower ratings to name-brand PCs

See Buyers' Scorecard, page 112

Product	Score 1991	Score 1990
Compaq's Deskpro	64	65
IBM's PS/2 (386)	62	66
Hewlett-Packard's Vectra 386	61	65
Apple's Macintosh II	60	63
AT&T Information Systems' 6386	58	62
Average	61	64
Highest possible score	81	81.5

Response base: 50 users per product

Jacob Gaboury

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10 Users aren't as confident as analysts are that IBM will bounce back from its 85% third-quarter plunge.

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"We are very much in favor of what's going on [with AD/Cycle]. We are just not ready to pay the rent."

EMMANUEL ACKERMAN
DEPOSITORY TRUST

On Repository Manager plans. See story page 6.

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The 5th Wave

"...AND FOR THE HIGH-TECH MAN IN YOUR LIFE, WE HAVE THIS LOVELY PC ON A ROPE."

EXECUTIVE BRIEFING

■ **IBM's OS/2 has traveled a bumpy road that some people say is turning hazardous.** When IBM said delivery of the 32-bit OS/2 Version 2.0 would be delayed by several months until March, OS/2's critics aired predictions that this latest problem sounds the death knell for the operating system. **Page 1.**

■ **'Quality IS development' doesn't have to be an oxymoron.** What organizations need to do is improve the methods they use to assure quality, particularly the way quality assurance groups work. By defining and measuring IS quality meaningfully, specifying IS management and developer responsibilities and carrying out the proper role of the quality assurance team, your software effort can be a standout. **Page 119.**

■ **IS managers say market research data plays a role** in their decision-making process, but it is not a critical element. **Page 87.**

■ **Users were more skeptical than analysts** when IBM suggested that people overlook the company's 85% drop in quarterly profits and believe that both the recession and IBM's own problems have bottomed out. Analysts say they believe IBM, but users tempered their confidence in IBM with notes of caution. Meanwhile, DEC and Andersen Consulting issued solid earnings reports. **Pages 10 and 14.**

■ **PC portability** has become even more attractive in the past year. New to market are palmtops that can run Lotus 1-2-3; 17-pound suitcases that contain a PC, fax/data modem and cellular phone; and notebooks with I486 speed, 100M-byte capacity and color screens. **Page 101.**

■ **When negotiations on a joint venture broke down,** rival airline reservation systems Sabre and Amadeus decided to go separate ways. The split means Sabre will pick up the pace in competing with Amadeus for European travel agency hookups. **Page 14.**

■ **Retailers plan more IS cost-control measures** with the expected approach of a less-than-jolly holiday season, a recent survey shows. **Page 87.**

■ **Vendor support hot lines offer a great career starting point.** There's lots of openings as well because vendors are under increasing pressure to provide more support. Starting salaries aren't high, but pay improves dramatically as you move up the ladder. **Page 132.**

■ **How can users get efficient answers from technical hot lines?** Be prepared. Read manuals carefully before calling, sit by the computer when making the call, make a list of questions, note all error messages and displays. **Page 141.**

■ **CA takes an unusual step** and announces computer-aided software engineering tools that will work with other vendors' database management systems. **Page 29.**

■ **AD/Cycle is rolling along,** IBM says, despite any customer dissatisfaction with Repository Manager. While some early users of Repository Manager have questioned its value, IBM says it considers the criticism to be aimed at one piece of AD/Cycle, not at the entire strategy. Users also say that implementing IBM's Information Warehouse requires a lot of up-front work. **Page 6.**

■ **On site this week:** Piedmont Hospital begins the move from proprietary Data General equipment to open systems and is relying on HBO & Co., its software provider, to help it along. **Page 29.** The National Center for Missing and Exploited Children is adopting new technologies to boost its effort to help find missing children. **Page 63.** California State University plans a massive fiber-optic network for its newest campus to link its buildings, the local public library and two nearby community colleges. **Page 75.**

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IBM hits rivals with PC upgrade, price cuts

BY MICHAEL FITZGERALD
CW STAFF

WHITE PLAINS, N.Y. — The increasingly savage assault on IBM's personal computer market share prompted the computer giant to take defensive actions last week, centering on price cuts and several new products, including a custom upgrade board to regain the technological high ground.

The board is based on the 386SLC, IBM's long-rumored custom version of Intel Corp.'s 80386SX chip. IBM claims that the 386SLC, which has 8K bytes of internal cache memory and an internal cache controller as well as power management capabilities, will improve the Personal System/2 Model 57SX's performance by as much as 88%.

IBM said the dual pricing and technology announcement was a statement of its future in the PC industry.

"I think you've been seeing this from us all year — we intend to be a very strong competitor both on performance and price," said Winifred Briney, vice president of personal systems marketing, for IBM's National Distribution Division.

IBM promised to ship the $780 processor upgrade board in December for its 57SX. A version of the 57SX that incorporates the SLC chip will be IBM's standard multimedia PC (see story below).

"That, more than the price cuts, will be an effective strategy in luring back some customers," said Frank Michnoff, program director at Meta Group, Inc. in Westport, Conn. "The market moves so quickly that if IBM can have it out there first and [maintain] a six-month lead, that's a tremendous advantage."

An IBM spokesman said IBM intends to develop customized versions of other Intel chips to help it gain further competitive advantage over other PC makers. However, IBM acknowledged that Intel is free to manufacture any IBM-designed variety of Intel's microprocessor family of chips and distribute them to its customers.

Despite analyst enthusiasm, many large IBM sites said they have moved away from 16-bit computing. "[The 57SX] is still a 16-bit path, and we want to take a look at OS/2 Release 2.0," said James H. Pilarski, computer systems and electronic parts manager at Rockwell International Corp.'s Graphic Systems Division in Westmont, Ill.

Pilarski added that Rockwell, which uses PS/2s almost exclusively, plans to buy 40 386DX-based Model 70s in the near future.

One user whose site is moving away from IBM PCs in general did say that the new 57SX upgrade card might bring his site back. "The price of the 57SX was above what we could get for a similarly configured Compaq, but we will definitely look into [the new chip] to see if it has the performance boost they say," said R. David Rahn, information center manager at American National Can Co.

Lower prices make up the second piece of IBM's strategy. Prices were cut between 9% and 41% on 21 PS/2 models, as well as up to 50% on a variety of memory upgrades. IBM also introduced four new Model 90s, two based on Intel's 25-MHz I486SX, two based on its 33-MHz 486DX and two new Model 95s based on the 25-MHz 486SX.

Accordingly, The biggest price cuts came on discontinued Model 90s and 95s based on the 20-MHz 486SX and the 25-MHz 486DX.

John Dunkle, vice president at Workgroup Technologies, Inc., said the price cuts will help IBM achieve its stated aim of "holding" market share in the PC realm.

IBM's 1991 market share has stabilized after slumping through the first six months of the year, but so far it has not achieved its goal.

IBM shops were predictably pleased by the price cuts. One microcomputer manager at a large Midwestern food company said his firm would help justify an IBM PC standard to his end-user clients who want clones.

IBM was not alone in cutting prices. Compaq Computer Corp. slashed prices on its Systempro family 5.5% to 17.6%.

Clearing the decks

IBM reduces prices of existing PS/2s to make way for new products

Model	New price	Decrease	CPU	Status
30-E31	$1,795	10%	10-MHz 80286	active
70-081	$3,675	10%	20-MHz 80386DX	active
P75-161	$10,645	33%	33-MHz I486DX	active
90-OG5	$4,945	41%	20-MHz I486SX	discontinued
95-OJ5	$7,295	33%	25-MHz I486DX	discontinued
95-OG9	$7,745	23%	20-MHz I486SX	discontinued
95-OJ9	$10,045	20%	25-MHz I486DX	discontinued
95-OKD	$13,895	16%	33-MHz I486DX	active

Source: IBM

CW Chart: Marie Haines

Specialized PS/2 widens IBM's multimedia scope

IBM made clear last week how multimedia technology fits into its desktop computing strategy.

The company unveiled a customized version of the IBM Personal System/2 Model 57SX, based on its new 80386 SLC chip, which is positioned as a multimedia personal computer.

The Ultimedia Model M57 SLC, priced at $5,995, will run OS/2 Version 2.0 for multimedia and Microsoft Corp.'s Windows 3.0 with multimedia extensions. Ultimedia is IBM's new brand name for its multimedia efforts.

Analysts and multimedia developers cited new Actionmedia II boards, jointly developed by IBM and Intel Corp., as a key piece of IBM's announcements.

The Digital Video Interactive (DVI) video and audio compression boards run under OS/2 Version 1.3 as well as Windows 3.0, in addition to DOS.

"Up to now, [multimedia] has really been a series of clever kludges. Now, we actually have mature, well-supported DVI products to work with," said Michael North, president of North Communications, Inc., a Santa Monica, Calif.-based developer of government and retail applications.

IBM also played up a series of multimedia centers and a multimedia sales force. IBM's strategy is not in conflict with the Multimedia PC consortium standards, analysts said [CW, Oct. 14].

MICHAEL FITZGERALD and CLINTON WILDER

Compaq picks EDS as high-end reseller

BY MICHAEL FITZGERALD
CW STAFF

HOUSTON — Compaq Computer Corp. shook up its traditional dealers last week by authorizing Electronic Data Systems Corp. to resell its products.

The EDS deal is expected to help Compaq increase sales of its high-end systems, such as the Systempro network server, analysts said.

"It sends a message to their dealer base that Compaq doesn't believe [they] can move high-end systems," said Doug Kass, senior analyst at Dataquest, Inc. in San Jose, Calif.

Compaq acknowledged that the signing of EDS could affect its relationship with its dealers.

"I can't tell you we'll get standing ovations from all our resellers," said Barbara Krumland, Compaq's director of worldwide distribution strategies.

Krumland said, however, that Compaq does not see "much overlap" between its traditional channel and EDS, whose integration projects typically have high-volume requirements.

EDS said it expects its deal with Compaq to let it give its multinational customers more consistent pricing, service and delivery. "This is targeted toward those multinational or large businesses that have very complex, major technical requirements," said Robert Neighbors, president of EDS' Technical Products Division.

Alan P. Hald, vice chairman of Microage, Inc. in Tempe, Ariz., expressed concern over the announcement but said Microage would not reconsider its distribution relationship with Compaq.

"I think we're seeing the beginnings of new battle lines being drawn, or possibly new opportunities for cooperation, between very large-scale systems integrators with a top-down perspective and emerging systems integrators with a bottom-up perspective, like Microage," Hald added.

The EDS agreement, which Compaq has been considering for nearly two years, is the latest in Compaq's effort to broaden its distribution channels. Compaq sells its products almost exclusively through dealers, but slow growth and customer purchasing shifts have prompted it to revamp its approach.

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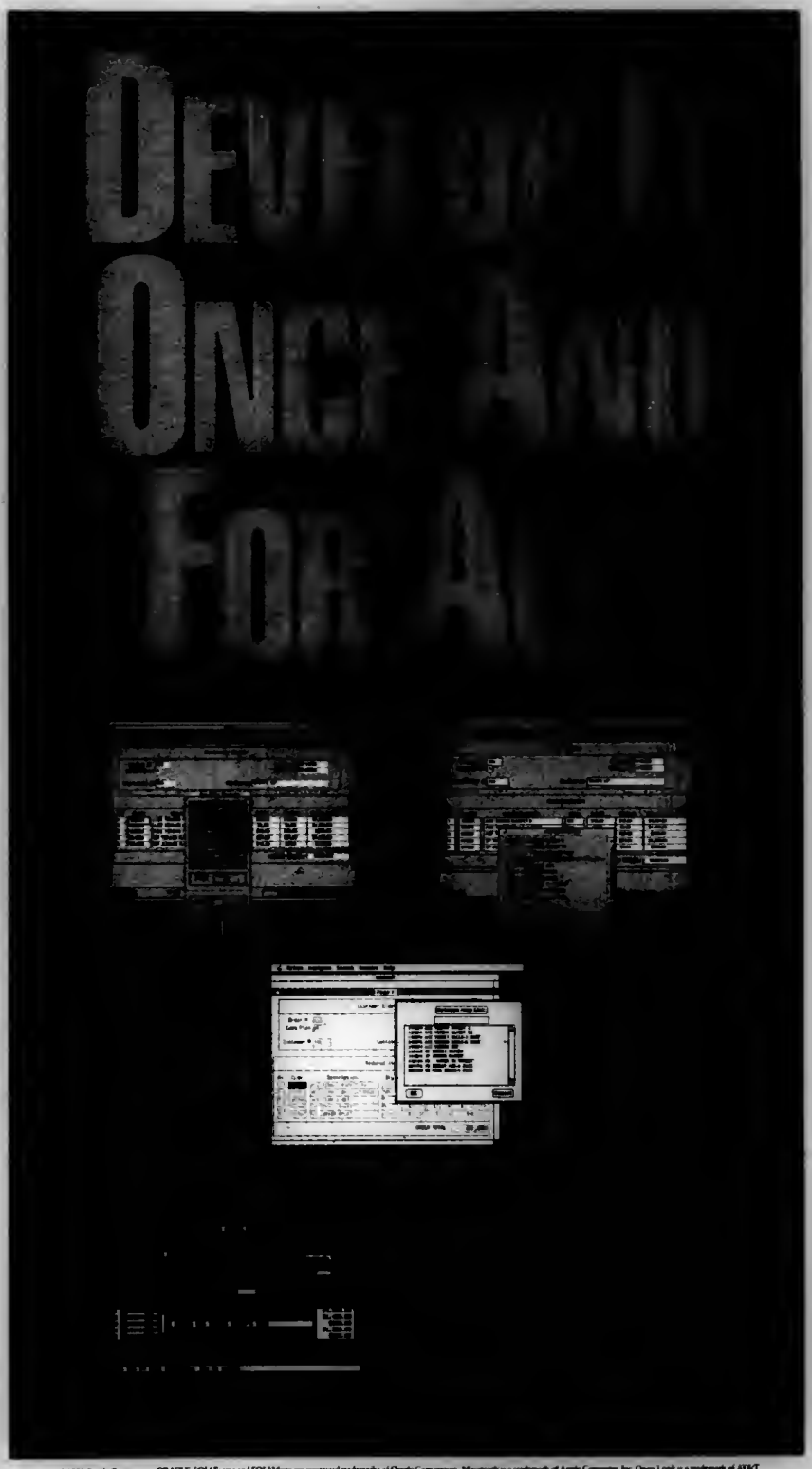

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IBM defends Repository's rep

Claims customer returns do not represent setback for AD/Cycle scheme

BY ROSEMARY HAMILTON
CW STAFF

IBM dug in its heels last week and insisted that even though several of its customers have returned Repository Manager, it is not a setback for its AD/Cycle initiative.

"I don't think it was a strategy criticism as much as one on the function [of Repository Manager] at this point in time," said Denis Clark, director of applications development marketing.

Several early Repository Manager users have long maintained that the product was so incomplete and difficult to work with that they were not able to accomplish much with it.

Earlier this year, both Merrill Lynch & Co. and Depository Trust Co. said they had stopped using it. More recently, the two users, along with a handful of others, shipped the software back to IBM. In short, users felt it was no longer worth paying for something that was not an active part of their applications development efforts.

Problem goes deeper

Some users and analysts said they do not agree with Clark's assessment of the returned repositories, however. They wondered if it reflects a more fundamental flaw in IBM's applications development initiative.

"It suggests that IBM is realizing the repository is much more complex than even they dreamed of in 1989," said Ed Acly, an analyst at Technology Investment Strategies Corp. in Framingham, Mass.

IBM introduced AD/Cycle in September 1989 as its applications development strategy and positioned Repository Manager as its cornerstone. The host-based software was designed to manage the applications development environment as the single point of control and integration of development tools.

An initial version began shipping in June 1990. Since that time, users, analysts and IBM itself have said the product is far from complete and needs lots of work before it can do what it was intended to do.

Users contacted last week said they have not abandoned the AD/Cycle strategy and would likely reinstall Repository Manager once it becomes a more robust product. For now, they are turning to more pressing applications development requirements, such as the organizational and cultural issues associated with computer-aided software engineering.

"We are very much in favor of what's going on [with AD/Cycle]. We are just not ready to pay the rent," said Emmanuel Ackerman, manager of data administration at Depository Trust. "We will get back in eventually."

Clark insisted that many users are still committed to AD/Cycle, so IBM has no immediate plans to adjust its strategy in response to the returned software. The company will not lower pricing, even though the hefty license fee is a chief beef among users. Nor will it change its schedule of delivering AD/Cycle products.

AT A GLANCE

Users sound off on Repository Manager's downside:

- Not worth keeping until it is a more robust product.
- Too expensive to maintain for educational purposes.
- Not a priority. Focus is on immediate CASE strategies.
- Difficult to work with.

Warehouse

FROM PAGE 1

"We did discover that the benefits from direct end-user access will be limited if you don't know where your data is or what it means," said Donald Walker, a technology strategy director at the Systems Division of Cigna Corp. The firm is running several pilot projects with EDA/SQL, a heterogeneous data access product set from Information Builders, Inc., and a key piece of IBM's Information Warehouse.

Several other customers either have warehouselike projects under way or are evaluating IBM's offering. They said it can be an enormous task to define or redefine data, remove redundancies and then establish standards for naming data elements.

"The tricky issue is to tell users what data is where and what is available," said Neil Ferri, an information systems vice president at Merrill Lynch & Co. in New York. "You need some way of cataloging it."

Merrill Lynch launched an effort last year to establish a data access architecture for IS and will be focusing more on end-user requirements in the future. According to Ferri, the IS architecture will be based on a technology layer to sit on top of production databases and handle requests from users.

The company built an end-user access tool two years ago for relational databases only and plans to evaluate the EDA/SQL product set.

Industry analysts said it is difficult to calculate what the typical up-front work and cost would be because each site has its own mix of databases and user requirements to get at them.

"It all depends on how much you bite off," said Tony Percy, an analyst at Gartner Group, Inc. "It could be anything, but I would guess it would be a minimum of a six-month effort."

IBM acknowledged that a heavy work load will likely be required to establish a warehouse. It has a number of service options — 36 in all — that can be applied to the warehouse concept. If a customer opts for IBM's assistance, it could cost well over $100,000 or as little as $10,000, depending on what help is needed, IBM said.

Cigna's Walker *said benefits to direct end-user access can be limited*

For example, a customer starting from scratch can work with IBM to establish a plan for building a warehouse for a fee of $12,000 to $15,000, said Dick Lockert, a senior programming administrator at IBM.

Cigna and other users who have been working on warehouselike projects suggest the best approach is to address the organizational issues while providing access tools for some of the more simple user requests.

Justice unit spurred on by cross-border hackers

BY MICHAEL ALEXANDER
CW STAFF

WASHINGTON, D.C. — The U.S. Department of Justice's formal launch of a computer crime unit was prompted largely by an alarming rise in computer invasions that traverse geographic and jurisdictional boundaries, according to a top Justice Department official.

Robert Mueller III, assistant U.S. attorney general, said the Justice Department needs to be better prepared to prosecute computer criminals. He is one of the architects of a five-person unit recently established by the Justice Department expressly to combat computer crime.

"One of the principal functions of the unit is to anticipate areas where federal, state and local law enforcement will have to expend resources in the future," Mueller said. "One that comes immediately to our attention is crime related to computers used as a target as in *The Cuckoo's Egg*." He was referring to author Clifford Stoll's account of how he tracked West German hackers who penetrated U.S. computers for the KGB in exchange for cash and cocaine.

Increasingly, computer crimes cut across state and international boundaries, making them difficult to investigate because of jurisdictional limits and differing laws, Mueller said. The computer crime unit will be charged with coordinating the efforts of U.S. attorneys general nationwide during investigations of crimes that may have been committed by individuals in several states.

One of the unit's first assignments will be to take a pivotal role in Operation Sundevil, last year's much-publicized roundup of computer hackers in several states. That investigation is still under way, although no arrests have resulted, Justice Department officials said.

The unit will coordinate efforts with foreign law enforcers to prosecute hackers who enter U.S. computer systems from abroad while also working to promote greater cooperation in prosecuting computer criminals according to Mueller.

Katherine Lambert

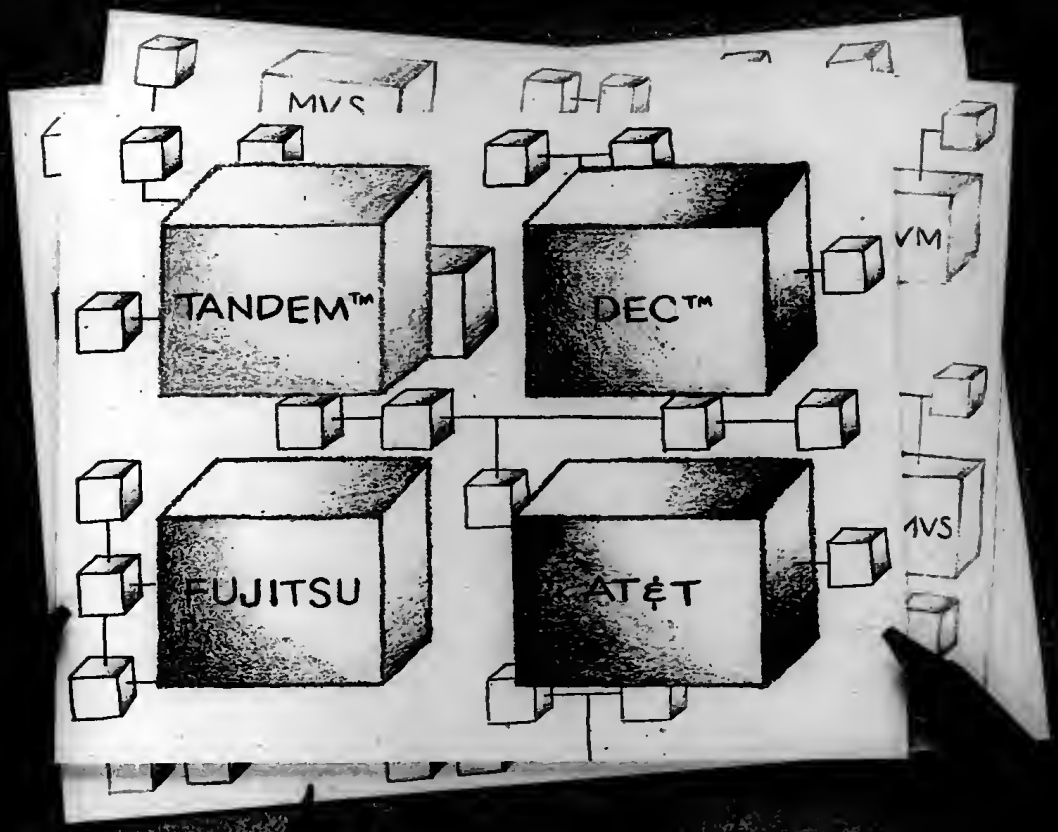
Mueller, left, and Charney *target nationwide computer crime with launch of new crime-fighting unit*

The unit will also assist in investigations when computers are used as a tool of a crime — for example, when a computer is used to divert electronically transferred funds — and when computers are incidental to a crime, such as when a money launderer uses a computer to store records of illegal activities, Mueller said.

"There have been many publicized cases involving people [illegally] accessing computers, from phone phreaks to hackers trying to take military information," said Scott Charney, chief of the new computer unit. "Those cases have high importance to us because any time that computers are the target of an offense, the social cost is very high. If you bring down the Internet and cripple 6,000 machines and inconvenience thousands of users, there is a high social cost to that type of activity."

The computer crime unit will also work to promote closer cooperation between the Justice Department and businesses that have been victims of computer crime, Charney said.

Law enforcers are better trained and more knowledgeable in investigating and prosecuting computer crimes, Charney said. "Businesses need not be concerned that we are going to come in, remove all of their computers and shut their businesses down. FBI and Secret Service agents can go in and talk to the victim in a language they understand and get the information they need with a minimum amount of intrusion."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NEWS SHORTS

Network group a reality

The Open User Recommended Solutions user group became a legal entity at Networld '91 last week. The group's 17 members initially met last June. Its charter is to work with vendors, standards bodies and other user groups to foster interoperability and integration among different vendors' products, according to the group's newly elected president and chairwoman of the board, Elaine Bond.

HP workers take early retirement

Hewlett-Packard Co. said last week that approximately 3,000 members of its worldwide work force have taken advantage of its voluntary employee reduction program. Most participants in the program left the company as of Oct. 15, the company said. Employees taking the voluntary severance incentives received six months' salary plus half a month's pay for each year of service, up to a maximum of 12 months' pay.

IBM to sell shares of MCI

IBM confirmed last week that it plans to sell $400 million worth of its preferred stock holdings in MCI Communications Corp. to an undisclosed private buyer. The sale "in no way reflects a change in" IBM's business relationship with the Washington, D.C.-based telecommunications company, an IBM spokesman said.

Apple shells out for trademark

Apple Computer, Inc. has settled a legal dispute with Apple Corps Ltd., the holding company formed by The Beatles to manage rights to their music and promotional material, for $29 million. In 1989, London-based Apple Corps sued the computer maker over the use of its trademark, a solitary apple. The suit charged that Apple Computer violated a 1981 agreement giving it the right to use an apple as a trademark as long as it did not sell products that create or synthesize music.

Bachman plans to go public

Bachman Information Systems, Inc. registered last week with the U.S. Securities and Exchange Commission for an initial public offering. The registration states that Bachman will offer 2 million common shares at $12 to $14 per share. No date for the offering has been set.

CSC protests Boeing contract

Computer Sciences Corp. (CSC), which recently lost an 11-year systems development and integration contract from the U.S. Army to Boeing Computer Services, has protested the award to an appeals board of the General Services Administration. CSC said its bid was $347 million lower than Boeing's $1.6 billion bid and that the Army failed to show the Boeing proposal justified the higher price. Both firms delivered prototypes that the Army found acceptable, CSC said.

Unix gets second look

Novell, Inc. and Unix Systems Laboratories, Inc. said last week they will form a joint venture to develop and market products and services for desktop Unix. Among the first goals: to better integrate Unix System V Release 4 and Netware.

Cook-off benefits missing children

Micrografx, Inc. has turned its third annual Comdex/Fall '91 Chili Cook-Off into both a celebration of the 10-year anniversary of the personal computer and a fund-raiser for the National Center for Missing and Exploited Children. Corporate sponsorship of the event, scheduled for Tuesday night in Las Vegas, has already raised more than $1 million. The more than 10,000 show-goers who are expected to attend will mingle with celebrities such as Miss Texas, the Dallas Cowboys and actors Sherman Helmsley and Spanky McFarlane and will get to watch singers George Strait and the Dixie Chicks perform.

More news shorts on page 148

Oracle updates CASE dictionary

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — Oracle Corp. revealed the third leg of its platform for a distributed database architecture last week, adding an enhanced CASE data dictionary to accompany the next release of its relational database management system and its recently announced SQL networking product.

CASE*Dictionary Version 5.0 was introduced along with two computer-aided software engineering (CASE)-based applications generators. All three CASE products will be available by year's end for Sun Microsystems, Inc. workstations and for Digital Equipment Corp. VAX computers, Oracle said.

Pricing for the CASE software will vary by computer type and number of users.

Taken together, CASE*Dictionary Version 5.0, the forthcoming Version 7.0 database and the SQL*Net 2.0 communications product — all due for volume shipment in 1992 — will push Oracle's 13-year-old technology forward.

"Shortly after Version 7.0 comes out, there will be another release of the CASE*Dictionary to support it more fully," said Richard Barker, senior vice president of Oracle's Product Division, who directs worldwide CASE development.

CASE*Dictionary Version 5.0 has a greater ability than the current Version 4.0 to generate prototype applications based on user-defined business rules, said Ian Fisher, director of worldwide CASE marketing at Oracle. Definitions stored in its data repository can also be used to create database tables for IBM's DB2 relational database, Fisher said.

Oracle's Barker *promises upgraded CASE*Dictionary to follow the next-version RDBMS*

Longtime Oracle users said they welcomed the news that CASE*Dictionary has been enhanced. "It will get you over the mundane parts of your programming so you can focus on tweaking and polishing the code that's generated," said Dale Lowery, director of advanced systems at VGS, Inc. in McLean, Va.

The new CASE software looks at a user's entity-relationship diagrams and turns them into data definitions and SQL code, Lowery explained. "It will implement your diagrams — right or wrong — and give you feedback on your design," he said. However, he added, the new Oracle CASE tools are intended for those who already understand how to do data modeling, not for novices.

Two new code generators, CASE*Generator Version 2.0 for SQL*Forms/SQL*Menu and SQL*Reportwriter/SQL*Plus Version 1.0, are intended to automate much of the programming process. The applications generated will be compatible with SQL*Forms 2.3 and SQL*Forms 3.0, both of which are widely installed Oracle programming products.

Applications written with older SQL*Forms products, however, will have to be reverse-engineered for use with CASE*Dictionary Version 5.0, Fisher said.

HP matches object-oriented DBMS to relational Allbase

BY J. A. SAVAGE
CW STAFF

PALO ALTO, Calif. — Object-oriented databases, still an exotic concept to mainstream users, will get a boost today when Hewlett-Packard Co. rolls out an offering that runs on top of its Allbase relational database.

HP is the first major vendor to offer such a product. OpenODB is slated to ship in December. Rival Digital Equipment Corp. is working with Objectivity, Inc., a Menlo Park, Calif.-based software vendor, to put an object-oriented database on top of a relational database.

The object-oriented database market is a small one, comprising seven small companies with sales estimated at between $10 million and $20 million. "Most are single-user workstation environments," said Tony Percy, vice president of software management strategies at Gartner Group, Inc. in Stamford, Conn. One exception is Ontos, Inc., which markets a multiuser, multiclient, multiserver object-oriented distributed database.

"OpenODB is analogous to what Borland advocates, which is an object-oriented layer on top of the Interbase relational database engine," Ontos Chief Executive Officer Frank Ingari said. Like Ontos, OpenODB is aimed at systems with hundreds of users.

OpenODB features include security and authorization, the ability to find data not located within OpenODB and bring it back in a form to which the user is accustomed and the ability to make changes in the data without requiring applications to stop.

Current languages such as C, C++, Cobol, Fortran and Pascal can be used to develop applications through a programmatic interface, according to Douglas Dedo, an HP marketing manager. Users, at best, have some pilot projects aimed at implementing object-oriented databases, but most, such as Bio-Rad Laboratories, Inc. in Hercules, Calif., cannot conceive of its use in the near term. "I only wish we were at that state of the art," said Lou Mills, business systems manager at Bio-Rad.

Currently, users must build their own object-oriented database applications.

Both applications developers and users would derive the expected benefits from having an object-oriented database. These benefits include ease of applications development and reusable code, according to Mohammad A. Ketabchi, associate dean of engineering and director of Santa Clara University's Object Technology Laboratory.

Initially, OpenODB will cost $100,000 for one to eight users, including five days of on-site consulting, phone support and two training courses. No price was set for the 100-user database, but Dedo said users can expect a price comparable to that of relational databases.

CORRECTIONS

In addition to several Intel Corp. 80386SX and I486-based personal computers, Wang Laboratories, Inc. also released an Advanced Micro Devices, Inc. AM386SXL-based system for its commercial line of PC products last month. The systems were listed as all Intel-based in the Sept. 30 issue.

An In Depth story [CW, July 15] incorrectly reported that Motorola, Inc. saved $44 million in external audit fees. The total savings was $4.4 million, a number that includes internal and external audit fees over five years.

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IBM Q3 earnings plunge 85%; says worst over

BY NELL MARGOLIS
CW STAFF

ARMONK, N.Y. — IBM convinced analysts last week to overlook an 85% third-quarter profit plunge and a 5.5% year-to-year quarterly revenue slide in favor of s forecast that the firm's troubles — and the recession — have bottomed out. Users proved a tougher sell.

"They said the worst is behind them, and I believe it," S. G. Warburg & Co. analyst David Wu said. "Their PC sales couldn't get any worse. Software is basically flat. On the other hand, they've got s brand-new generation of mainframes and a virtually new AS/400 line shipping."

Recent upgrades in the Application System/400 midrange family, industry analyst Robert Djurdjevic said, were so dramatic as to create "a new machine under the old name." That fact, he said, moots any concern that the AS/400, whose robust sales gave IBM's third quarter one of its few bright spots, is nearing saturation.

Users, however, tended to take a skeptical view of IBM's economic forecast. "If this recession is ending, I can't see where," said Ralph van Putten, U.S. corporate banking technical systems and support manager at the Royal Bank of Canada in New York.

IBM's $14.4 billion in third-quarter revenue "came in about where I expected, and [its $172 million] net income beat my estimate by s bit," Montgomery Securities, Inc. analyst John B. Jones Jr. said.

However, if the bad news in the firm's quarterly report was less than Wall Street feared, Jones said, the good was better than many hoped: sales and general and administrative expenses down for the first time in close to two decades, virtually flat operating expenses and a promise that at least 3,000 more IBM workers will be eliminated by year's end.

Less speculative, Jones said, is IBM's claim of pent-up demand for its new mainframes. Constraint in the Enterprise System/9000 line is strictly on the supply side: IBM cannot make them as fast as it can sell them, he said.

Still big, still blue IBM

IBM remains the industry leader, but its revenue growth and profit margin have been paltry

	Revenue	Profit	Net profit margin
1990			
Q3	$15,277B	$1,112B	7.2%
Q4	$23,061B	$2,461B	10.6%
1991			
Q1	$13,545B	$(1,731B)	(12.8)%
Q2	$14,732B	$114M	0.7%
Q3	$14,43B	$172M	1.1

Source: IBM — CW Chart: Michael Siggins

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DEC profits rise; future uncertain

BY NELL MARGOLIS
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. last week bucked a worldwide recession, unfavorable currency translations and an ongoing, massive organizational and product overhaul to bang home solid, if unstellar, sales and profit increases in its first fiscal quarter.

For the period ended Sept. 30, DEC posted revenue up 6% to $3.2 billion and a 9% profit jump, or $28.6 million, compared with sales and net income reported in last year's comparable period.

Unlike rival IBM, whose stunning — albeit anticipated — summer quarter decline lent luster to DEC's modest gains, the latter quashed any thought that widespread economic recovery is at hand. IBM claimed the opposite (see story above).

"The economic malaise [that has affected] our industry continues. We see no uptick, and most economists are saying the same," said Jack Smith, DEC senior vice president of operations. And the economic woes have gone global, he said, adding, "We see weakness in all geographical areas."

In addition to several dramatic product line debuts scheduled to occur during the next twelve months — including sweeping change to the high-end VAX line, slated for the 30th of this month (see story page 12) — DEC is pegging its forward march to an expanding sales force, a contracting head count and "an extremely aggressive move to add VARs and strategic partners," Smith said. He declined to say whether the firm's pledge to continue a cost-control intitiative that sent some 4,000 employees packing during the first quarter will translate into greater work force cuts than previously targeted.

While declining to break out specific numbers, Smith noted, "All our service areas are showing double-digit growth — especially software." But the ace in the future for DEC, he said, will be systems integration. Although it accounts for "only s small fraction" of DEC's current total revenue, systems integration grew 50% in the first quarter.

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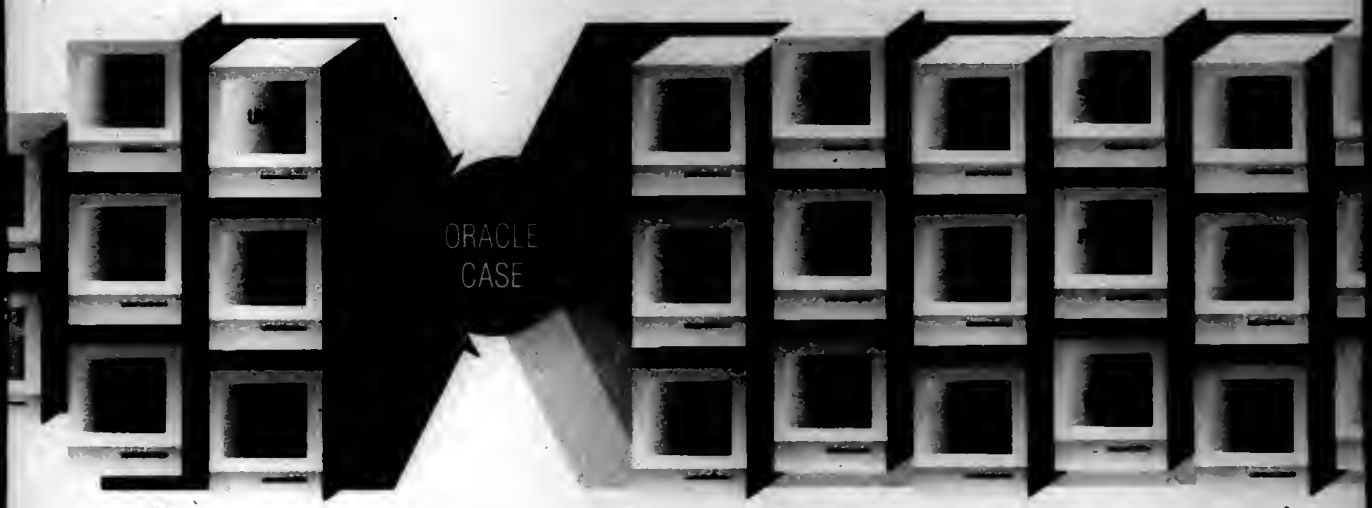

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VAX 9000

CONTINUED FROM PAGE 1

ing at least 200 employees into other company divisions.

"We like DEC's game plan, but obviously, we're going to watch the execution of it," said George Kerns, vice president of information management at GTE Mobile Communications, Inc. in Atlanta. "As we triple the size of our processing load in the next 12 months, we want to be sure the products on the hardware and software side are there to help us manage that load."

Kerns was one of several mainframe customers briefed last month on the new strategy. Many of those users have been hammering DEC to give mainframe-class operating system software the same attention hardware gets, Kerns noted.

The changing strategy is designed to do just that, Whitman said. He outlined for *Computerworld* what DEC will announce next week on the VAX 9000.

First, DEC reorganized the mainframe business unit in a way that de-emphasizes hardware in favor of a production system approach, providing the kind of operating system software and tools that customers are demanding.

All VAX 9000 system management software is now the responsibility of DEC Vice President David Stone's Software Products Group, and Vaxcluster engineering and development now belongs to DEC Vice President William Demmer's VAX Systems and Servers Group.

GTE Mobile's Kerns *says, 'We like DEC's game plan'*

DEC will also announce a VMS software products rollout during the next six to nine months. Featured will be data center tools such as class schedulers, batch and print queue scaling capabilities and extended memory support, as well as other software designed to improve systems management and availability.

Three new VAX 9000s will be coming between the current product line and the Alpha line of reduced instruction set computing machines in late 1993. They will be based on CMOS chips rather than the current emitter-coupled logic chips in what Whitman said results in "dramatic" cost savings in manufacturing for DEC and price/performance improvements for users (see story below).

The first CMOS-based models will be the 9X15 line, slated to be introduced in March 1992, with enhanced memory (up to 2G bytes internally), greater I/O and additional reliability features. Next summer, the VAX 9600 will arrive as the upgrade platform to the Alpha line. Customers will be able to board-upgrade the VAX 9600 to the Alpha VAX without changing software or peripherals.

A VAX 9800 is also expected to be available in early to mid-1993 as another stepping-stone to the Alpha VAX.

Pricing will be disclosed in January and should stay within the current $1 million to $3 million range, DEC officials said.

DEC is also announcing "disaster-tolerant" clustering of VAX 9000s through the use of Fiber Distributed Data Interface (FDDI) links. Lloyds Bank of London, which has the largest DEC mainframe installation in Europe, is field-testing a disaster-tolerant cluster of four VAX 9000s now.

Alan Pout, head of systems at Lloyds Registrar's Department in Worthing, England, said the mainframe FDDI clustering capability allows the bank to divide the four machines between two physically separate computer centers there.

"We find that very attractive because we can distribute the data between the two centers," Pout said.

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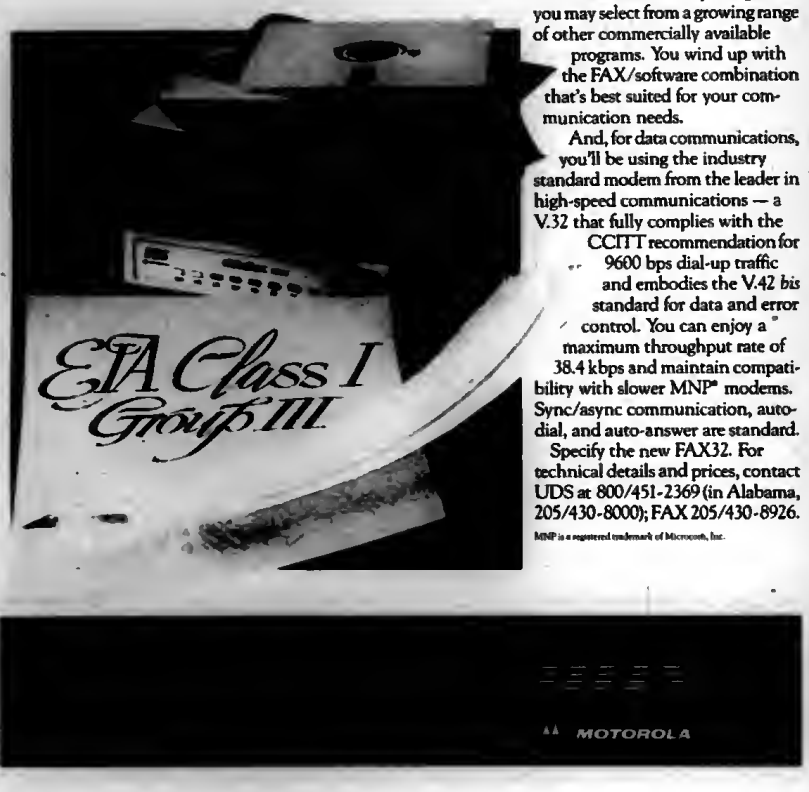

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For DEC VAX 9000 users, the change in the underlying chip technology, moving from ECL to CMOS on the mainframe, will translate into more performance at less cost.

Manufacturing advances in chip packaging are enabling DEC to put on a single CMOS chip what took dozens of ECL chips to accomplish, noted Phil Grove, marketing manager for the VAX 9000.

While both are transistor-based silicon chips, CMOS and ECL differ markedly in the heat and power they generate. CMOS was designed to require less power to accomplish its different logic functions, but until now it needed more space to perform the same function as an ECL chip. The older ECL technology, while more powerful, was considerably hotter than CMOS. When used in mainframes, it required elaborate cooling systems.

MARYFRAN JOHNSON

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Consultancy revenue rises 20% in '91

Andersen Consulting credits outsourcing deals in the past year for the performance boost

BY ELLIS BOOKER
CW STAFF

CHICAGO — Andersen Consulting closed the books on its 1991 fiscal year last week, reporting worldwide net revenue of $2.26 billion, a 20% increase over the previous year.

Company officials said they were grateful for the result, noting that the increase came in the face of a recession in the U.S. and the shudder caused by the Persian Gulf war.

Nevertheless, these officials said they were only "cautiously positive" about prospects for the coming year.

"The economies in the industrialized world clearly have not picked up," said A. George Battle, managing partner at Andersen Consulting's Market Development Group, speaking last week at the Worldwide Annual Partners' meeting of The Arthur Andersen Worldwide Organization in San Francisco.

"Our sense is that this has been a very tough year to be in information technology, professional services or consulting, which is why we say we are grateful," Battle said.

Andersen reported that its Europe/Middle East/Africa/India region showed the strongest growth at 37%, followed by Asia/Pacific and the Americas.

Of its six major industry practices, Andersen said, revenue from health care consulting showed the biggest gain over the past year, growing 45%.

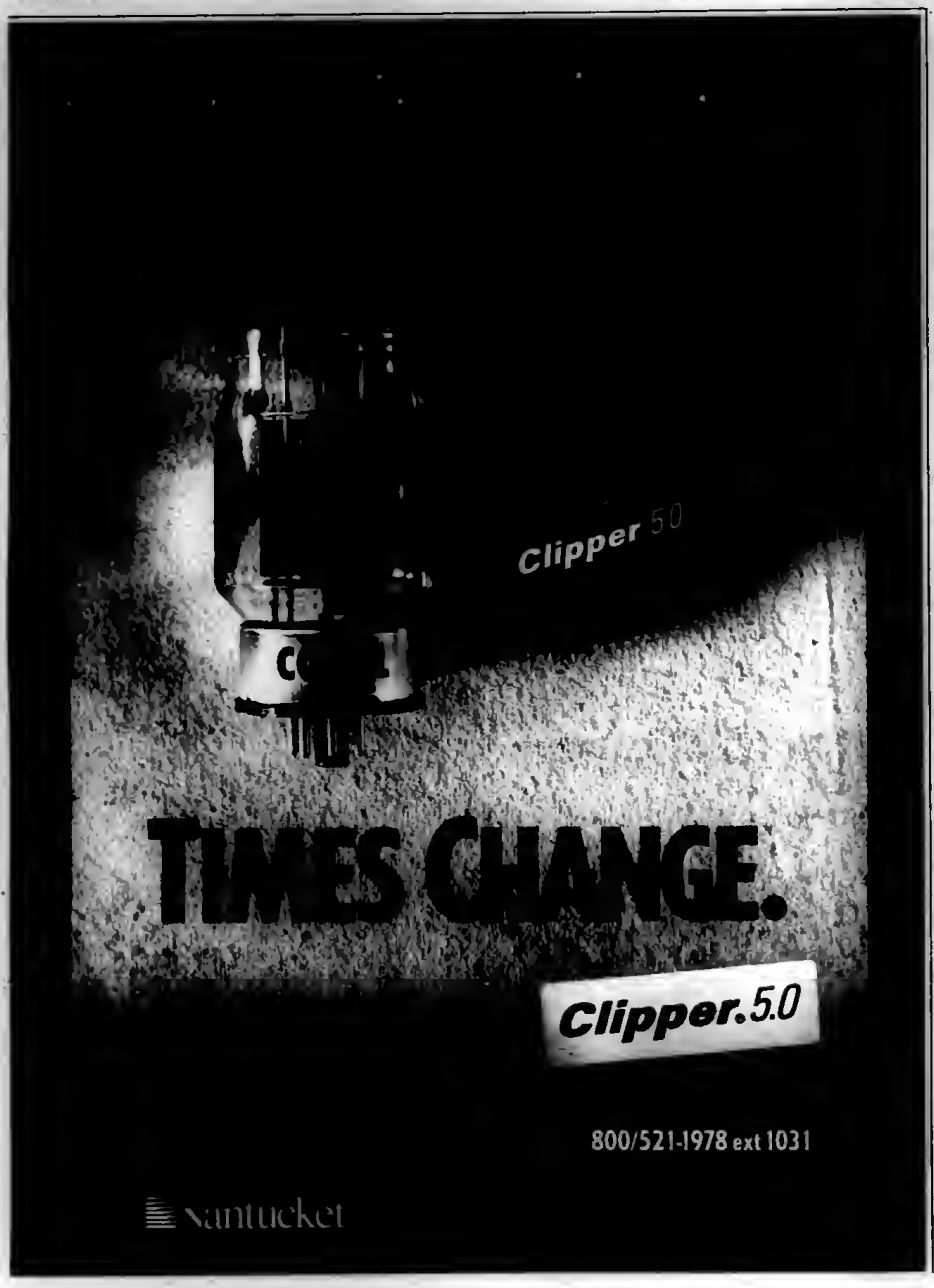
While privately held Andersen Consulting does not break out its revenue by line of business, observers said they believe systems integration continues to account for 65% to 70% of the unit's revenue.

Outsourcing work is certainly a fast-growing business for Andersen, which inked more than a dozen major outsourcing deals in the past 12 months.

Outsourcing was responsible for $100 million in revenue last year, up from about $70 million in fiscal year 1990, according to a spokesman.

Still, Andersen slowed the growth of its consulting force, adding just over 1,000 people compared with the more than 2,400 it hired between fiscal year 1989 and 1990.

Andersen currently employs 21,668 consultants.



Sabre ready for takeoff in Europe

BY MITCH BETTS
CW STAFF

FORT WORTH, Texas — Sabre, the highly successful reservation system run by American Airlines, is set to pounce on the European market now that a proposed alliance with Europe's Amadeus system has collapsed.

Sabre's go-it-alone strategy for Europe follows the breakdown last week of negotiations for a joint venture with the Madrid-based Amadeus Global Travel Distribution consortium, which includes Air France, Iberia Airlines and Lufthansa German Airlines.

"We will resume our aggressive sales efforts throughout Europe," said Kathy M. Misunas, president of the Sabre Travel Information Network. Analysts said the result will be more competition in the European market for computerized reservation systems. "It should be great for [Europe's] travel agents," said Stephen Arsenault, a transportation consultant in New York.

He said the three major systems vying for travel agency accounts will be Sabre, Amadeus and Galileo, a European consortium led by British Airways. Sabre has an 11% market share in Europe and a 34% market share in the U.S.

The Sabre/Amadeus talks broke down over marketing turf battles and American Airlines' frustration in dealing with each unit of the multinational consortium. European carriers are beginning to view American as a competitor as it acquires U.S.-to-Europe routes, analysts said.

"They've become more rivals than allies as the global market develops. So it's not surprising they couldn't work out an agreement where they could stay out of each other's way," said Raymond E. Neidl, airlines analyst at Dillon, Read & Co. in New York.

The Sabre/Amadeus alliance was doomed from the start because its goals were not clearly defined, said Frank Jackman, an editor at the "Aviation Daily" newsletter in Washington, D.C. "When they first announced the deal in November 1990, it was never really clear what they wanted to accomplish," he said.

Analysts said Amadeus, which has had trouble getting off the ground [CW, June 24], is likely to look for another U.S. partner such as Worldspan, a reservation system partnership led by Delta Air Lines.

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Borland, Ashton-Tate are one

BY JAMES DALY
CW STAFF

SCOTTS VALLEY, Calif. — Borland International, Inc. completed its $439 million purchase of Ashton-Tate Corp. last week, killing off several products and indicating that it will drop Ashton-Tate's lingering copyright suit against Fox Software, Inc.

Ashton-Tate products that are headed for the scrap heap include its Multimate DOS word processing package, its Applause presentation graphics application, its Rapidfile flat-file database management product and its Control Room utility. Technical support and customer service will remain in effect for the discontinued products, Borland officials said.

There was good news, however, for users of Ashton-Tate's Dbase. Borland Chairman Philippe Kahn said the company will continue DOS and Windows upgrades to both Dbase and Borland's Paradox database applications.

The affirmation eased the minds of worried Dbase users. "Dbase has become the de facto standard in many cases — whether that's good or bad is almost secondary to the fact that you have a large body of users out there that know it," said Jack Detrick, director of data processing at Centinela Hospital in Los Angeles.

Kahn earlier described plans to take both Dbase and Paradox customers to a new generation of database software.

That migration path will be paved by the Object Dbase compiler, which will act as "the glue between the two databases," said Rob Dickerson, general manager of Borland's database business unit.

Object Dbase is a Dbase language tool that will recompile Dbase III Plus and Dbase IV programs, allowing them to run under Windows while it links them to the Paradox engine. By supporting Dbase in this fashion, Borland can support existing Dbase applications and add much-needed extensions to the Dbase language. No shipping date was provided.

Borland will continue to sell and support Ashton-Tate's applications for the Apple Computer, Inc. Macintosh platform but is still debating future plans for that product line. Additionally, upgrades are planned for a Windows version of Ashton-Tate's Framework business application, Borland officials said.

The first steps in ending Ashton-Tate's 3-year-old copyright litigation against Fox Software also began last week when Fox dismissed its counterclaims. Kahn has proclaimed that Borland intends to compete through technology, not through the courts.

Justice steps in

The U.S. Department of Justice stepped into the legal fray recently when it warned that it might file a civil antitrust suit challenging Borland's purchase of Ashton-Tate if Borland did not resolve the Fox Software dispute. A Justice Department decree further directs Borland to dismiss its claims against Fox, if Fox dismisses its counterclaims against Ashton-Tate.

Borland, known for a lean management style, has already made deep cuts in Ashton-Tate's work force. Last Monday, 520 Ashton-Tate employees were cut, leaving approximately 730 former Ashton-Tate employees in the Borland fold. Borland has about 1,100 employees. Ashton-Tate President William Lyons is expected to depart after a brief transitional phase.

The completed merger propels 8-year-old Borland into the top tier of personal computer software makers, with annual combined company sales of about $500 million. With the acquisition, Borland now controls more than 60% of the $500 million-a-year PC database market, according to Framingham, Mass.-based market research firm International Data Corp.

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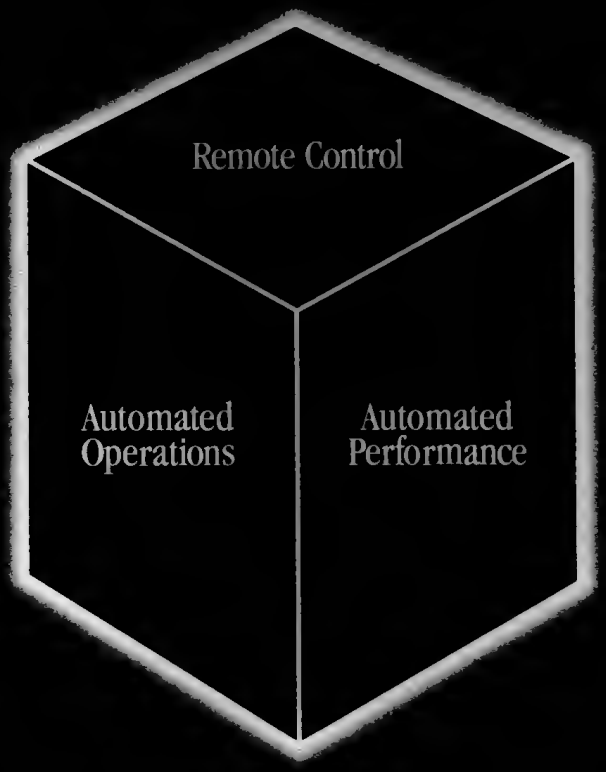

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Sound technology used in Bose audio gear has applications in movie theaters, speakers and television sets

BY MICHAEL ALEXANDER
CW STAFF

Imagine you have been given a piece of plastic pipe 80 in. long and 6½ in. wide. Inside the pipe, at exactly one-third its length, is a high-fidelity speaker. Now, fold the pipe so that it fits inside a box that is 18 in. wide, 10½ in. high and varies in width from 5½ in. at the middle to 6¾ in. at the ends. The pipe must be folded in such a way that it occupies only two-thirds of the interior space and that both openings of the pipe face outward at the right- and left-hand corners of the box.

Seems like one of those nearly impossible math problems that many of us had to solve in high school, right?

That is the challenge that audio engineers at Bose Corp., one of the world's top audio companies, faced when trying to revamp its popular Acoustic Wave portable sound system. At a suggested retail price of about $1,000, the Acoustic Wave is not an ordinary patio blaster but an upscale blend of push-button simplicity and outstanding sound quality.

The tube in this all-in-one unit is an "Acoustic Wave Guide," a patented technology that exploits the laws of physics to pump out a prodigious amount of bass using the motions of a small speaker and forcing the air currents through a tube. Variations of the technology have been used in best-selling home speakers, motion picture theater sound systems and high-end television sets.

Each of the tube's physical attributes is critical: Varying the pipe's length and width, the placement of the speaker or any other variables affects the Acoustic Wave's performance. In addition to squeezing the tube into the enclosure, the engineers were also faced with finding enough room to fit a compact disc player, an AM/FM radio and two tweeters for high frequencies. Finally, the entire enclosure had to be airtight, yet provide adequate ventilation for the heat given off by the product's electronics.

Network needed

With so many variables to consider, the engineers turned to a network of Sun Microsystems, Inc. and Digital Equipment Corp. workstations running computer-aided design (CAD), acoustic modeling, stress analysis and other software.

"We found with this and several other projects that without CAD tools it became a prolonged or impossible engineering task," explained Shraz Daya, engineering manager for new product development and product manager for the Acoustic Wave.

"When you look at a cross-section of the tube itself, to get the best acoustic performance you need a uniform cross-section area across the length," Daya said. "That is where CAD is a powerful tool, to lay out the tube and verify that it has the cross-section that you need and still fit everything in."

At the same time, the audio effect of each refinement in the tube was simulated on a workstation using sophisticated sound-modeling software.

Bose's Daya *holds a model of the Bose Acoustic Wave. The yellow and red areas show the Acoustic Wave Guide, an 80-in. long tube folded into the unit*

"You could make adjustments on the tube and look at the electronic model for optimal performance and mechanical constraints," Daya said.

The engineers were also able to experiment electronically with the thickness of the plastic used to create the tube and the enclosure and simulate the stresses on the entire product's walls.

After determining the optimal design for performance, the next step was to design a product that used fewer plastic parts than its predecessor, to shave time off assembly and to improve quality.

Ultimately designing the product required a series of trade-offs in performance, thickness of materials and other constraints. "If it weren't for CAD, I am unsure that you would have been able to optimize performance at all points," Daya said.

The improvements were a series of careful refinements, not giant leaps in performance or price, Daya said. Still, the engineers were able to improve the product's performance, boost quality, use fewer materials and streamline manufacturing.

Automated factory could stitch up clothing hole

BY MICHAEL ALEXANDER
CW STAFF

While U.S. military hardware was capturing the glory during the Persian Gulf war, soft wear, and the lack of it, was giving some military commanders heartburn.

"One of the problems with Desert Storm was getting clothing rapidly and in sufficent quantity to the Gulf," said Howard Olson, a mechanical engineer at the Georgia Institute of Technology's School of Textile and Fiber Engineering in Atlanta. The nation's suppliers of apparel — from uniforms to bulletproof vests — were simply not equipped to handle the sudden demand, he said.

Olson and fellow researchers Lew Dorrity and Mathew Sikorski are working on pieces of the fully automated apparel factory of the future, one that the military hopes will help it be better prepared for war.

The military is also concerned that "the cut and sew business" will go overseas because of cheaper labor costs, Olson said. "The key thing for the military is that there has to be an industry available here."

The research at Georgia Tech is being sponsored by the U.S. Defense Logistics Agency, which purchases apparel and other items for the U.S. Department of Defense.

Most of the machinery for the automated apparel factory is already available. What is missing are ways to quickly and accurately examine the quality of goods being made, a task that is largely handled by human operators today, Olson explained.

"The machines themselves have microprocessors on board doing a variety of jobs, such as controlling speed, type of stitch, as well as reporting back what is happening to a monitoring station," Olson said. Eliminating human operators will "close the loop," he added.

The researchers are using computer and sensor technologies to analyze how quality is affected in the sewing process. "The approach was to look at the root causes of defects, some 200 of them, assigned to sewing causes," Olson explained. The flow of sewing thread at the wrong speed could be the cause of several defects, for example.

As part of their work, Olson, Dorrity and Bernard Gunn, a student researcher, developed "electronic ears" that may help automated sewing machines of the future supervise their own work. The "ears" and other sensing devices would allow the machines to detect problems before they cause defects in apparel.

When sewing together fabric, needles normally push aside the threads in the fabric. Dull needles can break the individual threads, causing visible defects in the garment and weakening the fabric at the seam.

Using a piezoelectric transducer that picks up sound, researchers measured the acoustic energy given off by sewing needles that had been subjected to varying degrees of wear. Computer analysis and a technique called Fast Fourier Transform revealed there were certain frequencies whose amplitudes increased when worn needles were used. The increase in amplitude was proportionate to the amount of needle wear.

The research led to the creation of a simple and inexpensive device that alerts the operator when it is time to replace the needle. Further analysis indicated that some needles were broken or chipped rather than simply worn. Researchers hope to develop sensing techniques to detect needle damage seconds after it happens.

Other research goals include using computers and sensors to detect when needles become clogged by a lubricant used on thread, misaligned fabric pieces, broken threads, improperly set thread tension and other mishaps that affect quality.

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EDITORIAL

Vegas follies

By the time this editorial appears, airplanes will have disgorged well over 100,000 Comdex goers into the desert oasis of Las Vegas, a city consumed with superlatives and excess.

Writers have a ball coming up with ways of describing the size of Comdex, such as estimating the amount of shrimp cocktail that will be eaten (tons), the number of miles attendees will collectively walk (zillions), or the number of people who will hear Wayne Newton sing *Danke Schoen* (more than wanted to).

But Comdex is one very large irony. Most people who attend would much rather not, including the nearly 2,000 exhibitors. It's too darn big, expensive and generally overwhelming.

At this point, they don't dare do otherwise because the show still delivers tremendous value. For exhibitors, there are valuable contacts among the legions of tire kickers. For users, there is no other single place where as much of tomorrow's technology can be seen, touched and debated. And for publications like this one, Comdex has generated more advertising business than any other event the industry could produce.

The Interface Group, which sponsors Comdex, knows these facts. Is it acting as responsibly as it should, or is it taking unfair advantage of its patrons, as some have suggested?

Consider that, for the last 10 years at least, Comdex has fallen in the second or third week of November. This year it was scheduled a week after Networld, which in fact cost The Interface Group some business. The group vehemently denied there was any intention in this timing to hurt Networld, claiming they couldn't book the big convention center any other time. Given that Comdex completely dominates the city while it is in session, we at least suspect that this scheduling was more than accidental.

Also, the Comdex organizers have consistently refused to divulge key attendee demographic data to its two advisory boards, which are charged with setting the agenda for the conference sessions. Partly as a result, the sessions tend to have an exaggerated slant toward resellers, even though the reseller community is a very small part of the audience.

The Interface Group has made some strides in addressing the sheer mass of Comdex by creating several shows within a show and breaking out certain technologies into separate areas.

Also, the group has handled the gargantuan problem of show logistics about as smoothly as possible. Comparing the speed of processing registrations at Comdex to the chaos that characterized registration at the defunct National Computer Conference makes this point well.

Still, there is room for improvement in what Comdex could deliver to its exhibitors and attendees. It's hard knocking the well-earned success of the show. But there's a saying that nothing recedes like success, and The Interface Group would do well to listen better to the grumbling beginning to be heard above the din at the biggest computer trade show in the world.

LETTERS TO THE EDITOR

New Jersey software licensing bill: Readers sound off

The following letters are reader responses to Computerworld *'s coverage of a New Jersey bill that proposes to license and regulate software developers [CW, July 15].*

As international president of the Association for Systems Management (ASM), I would like to express ASM's opposition to the New Jersey Software Designer Licensors Bill (A 4414). ASM, which represents 8,000 information systems professionals worldwide, has 500 members living or working in New Jersey who, depending upon one's interpretation, could be affected by the bill.

What concerns us most about the bill is its ambiguity and lack of precision in defining exactly who would be required to be licensed. Depending on how far you let your imagination run, "software designer" could mean anyone from the director of systems development to a programming trainee. We believe it is bad public policy to pass legislation when you are uncertain who it affects.

Also, most of those to be protected would be business, and we have heard no great clamoring from the business world for government protection from unqualified software designers.

Finally, if passed, this bill would create a whole new bureaucracy — complete with its expenses and red tape — to administer the program.

ASM reasserts its position that businesses should more vigorously promote the continuing professional development of their IS employees by supporting employees' involvement in professional education organizations and efforts to become certified in their field.

Paul R. Saunders
Association for Systems Management
Cleveland, Ohio

The New Jersey legislature is solely interested in money.

- Nothing in their legislation concerns the ethics of programmers, nor does it make any provision for restricting or refusing licensing based on past performance or customer complaints.
- The legislation fails to provide relief for clients of licensees. If clients are expected to find relief using existing tort laws, then the licensing is not needed.
- The cost of licensing is excessive. It could be done in the same manner, location and at the same cost as a driver's license.

If the legislature really wants to protect the consumers, it should provide meaningful regulation for lawyers and politicians!

Gerhard Postpischil
Expert System Programming, Inc.
Vienna, Va.

This bill does nothing to license software management, yet the key decisions affecting software quality are made based on a bottom line that has nothing to do with sound practice.

The software developer often has no control over such matters as schedules, debugging tools or promises made to the customer.

I see nothing in the bill likely to ensure standards of competency or quality.

The entire issue of software quality is a red herring. The true purpose of this bill is to raise revenue at our expense.

Were the issue truly one of quality, the bill would require that license fees be commensurate with the costs of administering the test.

Seymour J. Metz
Annandale, Va.

The urgency for the Software Designers Licensors Bill is greater than ever.

Today, anyone could claim they are a consultant without any supporting criteria. This devalues the integrity of consultants who have spent years in the industry and passed the rigorous examinations to achieve certified data processor.

The test administered by the Institute for Certification of Computer Professionals is voluntary and attempts to establish a measurable degree of competence and professionalism. Approximately 60% of the people who take the test fail.

In today's unlicensed environment, this 60% and countless more who do not take the test are free to provide their services to the unsuspecting consumer.

It is entirely conceivable that the Software Designers Licensing test requirements could be patterned along the same lines.

Leonard F. Turi
TMS Consulting Services, Inc.
Farmingdale, N.J.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

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Let's look before we legislate

Laws are adequate to handle computer crime. 'Net Police' not needed

MARC ROTENBERG

The U.S. Department of Justice is now circulating a proposal to expand the reach of federal computer crime law. On first pass, this might seem a sensible response to concerns about computer crime. The reality, however, is that the current federal law is more than adequate and the Justice Department proposal is poorly conceived.

The Justice Department proposal will give federal agents broad authority to investigate computer crime, allowing them to intercede in any situations involving a computer hooked to a network.

Creating a worm or virus could become a felony act, no questions asked. Espionage laws would be broadened and intent requirements would be lowered. Certain procedural safeguards would be removed from existing law.

Current law adequate

Taken as a whole, the proposal will make it possible for the federal government to prosecute many more computer crimes, but the question is whether this additional authority will improve computer security. Between the current federal statute, the Morris decision and the sentencing guidelines, federal prosecutors already have more than enough tools to prosecute computer crime.

Under the Computer Fraud and Abuse Act, passed in 1984 and amended in 1986, the unauthorized use of a computer system is a felony. Though the act does not define what "authorization" is or how it is obtained, a person found guilty faces up to five years in jail and fines of $250,000. It is a far-reaching law whose boundaries are still not known.

The Morris factor

The Morris case strengthened the hand of federal prosecutors still further. The judge ruled that it was not necessary for the government to prove that Morris intended the harm that resulted when the worm was released, only that he intended unauthorized use when he did what he did.

From a common law viewpoint, that's a surprising result. Traditional criminal law distinguishes between trespass, burglary and arson. In trespass, which is a misdemeanor, the offense is entering onto someone's else's property. Burglary is simple theft and arson is destruction. To punish a trespasser as an arsonist is to presume an intent that may not exist.

A federal appeals court affirmed the Morris decision, and the Supreme Court has refused to hear his appeal, so now the computer crime statute is essentially a trip-wire law. The government only has to show that the entry was unauthorized — not that any resulting harm was intentional.

There is another aspect of the Morris case that should be clearly understood. Some people were surprised that Morris served no time and jumped to the conclusion that sentencing provisions for this type of offense were insufficient. In fact, under the existing federal sentencing guidelines, Morris could easily have received two years in jail. The judge in Syracuse, N.Y., considered that Morris was a first-time offender, had no criminal record, was unlikely to commit a crime in the future and, not unreasonably, decided that community service and a stiff fine were appropriate.

To "depart" as the judge did from the recommended sentence was unusual. Most judges follow the guidelines, and many depart upward.

That said, if the Department of Justice persists in its efforts, there are at least three other issues that should be explored.

Unanswered questions

First, there is the question of whether it is sensible to expand the authority of federal agents at the expense of local police and state government. If theft from a cash register is routinely prosecuted by local police, why should the FBI be called in if the cash register is a computer.

What will happen to the ability of state government to tailor their laws to their particular needs? Do we really want "Net Police"?

There is also the need to explore the government's performance in recent computer crime investigations before granting new powers. For example, the botched Operation Sundevil raid, which involved almost one quarter of all Secret Service agents, resulted in hardly a conviction. (A good cop could have done better in a night's work.)

In a related investigation, Steve Jackson, the operator of a game business in Utah was nearly forced out of business by a poorly conceived raid.

In fact, documents just released to Computer Professionals for Social Responsibility by the Secret Service under the Freedom of Information Act raise substantial questions about the conduct, scope and purpose of Operation Sundevil investigations. They reveal, for example, that the Secret Service monitored and downloaded information from a variety of on-line newsletters and conferences.

A congressional hearing to assess Operation Sundevil would certainly be in order before granting federal officials new powers.

Protection of rights

Finally we should not rush to create new criminal sanctions without fully recognizing the important civil liberties interests in information technologies, such as the rights of privacy and free expression. There are, for example, laws that recognize a special First Amendment interest in newsroom searches.

But no case has yet made clear the important principle that similar protections should be extended to computer bulletin boards. New criminal sanctions without necessary procedural safeguards throws off an important balance in the criminal justice system.

Expanding the reach of federal law might sound good to many people who are concerned about computer crime, but broadening criminal law is always double-edged. Could you prove to a court that you have never used a computer in an "unauthorized" manner?

Rotenberg is the Washington, D.C., director of Computer Professionals for Social Responsibility and has testified in both the House and the Senate on computer crime legislation.

Who could resist these high-tech toys?

MIKE COHN

Get on the phone to Vegas. Book a flight. I'm telling you, you don't want to miss Comdex/Fall '91.

Forget the economy. Forget how hard it is to impress the CEO with new technologies. Show organizers are pulling out all the stops, and there's lots of new and sexy stuff this fall.

Need a sneak preview before you call your travel agent? Here's just a sample:

• **Personal Communication Devices (PCDs).**

Dick Tracy wristwatches aren't just in the funny papers. They're here and now, and you'll get more than just a glimpse of PCDs at this show. They'll be on display and ready to ship, complete with audio, video, digital readout, key-entry and paging.

They haven't worked all the bugs out yet, but don't let that stop you. Bring your checkbook, and you may be the first to strap a PCD to your wrist. You may also be the first to dislocate your shoulder, since these babies weigh in at 60 pounds.

• **Expert systems.**

Save your shoe leather and don't wander up and down the aisles looking for new expert system technology. Artificial intelligence is too expensive and "expert" systems are out. What's in as a low-cost alternative are "novice" systems. Companies on a budget can also check out the booths offering "educated-guess" systems, "take-a-stab" systems and "hold-on-and-let-me-ask-the-guy-in-the-next-cubicle" systems.

• **Open systems.**

Enough already with all this "open" stuff! Open connectivity, open platforms, open architectures. Personally, I'd like to see things get a little more closed.

But, in the meantime, expect still more ventures into the marketplace for open systems. Look for big announcements on twist-off and pop-top systems, with Ziploc coming in early '92.

• **Disk storage.**

Everyone who wants dense DASD has it. Everyone who want's RAID has it. Everyone who wants optical has it. Nobody wants new storage. So watch for an announcement at Comdex about a new program designed to encourage customers to use their old storage as often as possible. Keep track of your I/Os and earn valuable cash and prizes. Just find the booth marked "Frequent Filer."

• **Baby Bells.**

The Bells have been chomping at the bit since Judge Greene's ruling. They'll be all over this show. They'll push voice telephony. They flaunt tele-info systems. They'll claim to have all kinds of leading-edge, postlitigation technology.

John A. Wasely

Don't believe it. The stuff's not new. It's decades old and has been sitting on the shelf, waiting for its day in court. You can tell, since all of it only works with rotary dial phones.

• **Laptops.**

Speed and power were in last year. This year it's portability. So look for the new laptop belt, laptop suspenders and the soon-to-sweep-the-nation Velcro laptop keyboard pouch. Keeps your laptop in place even when you're standing up. So comfortable you don't even know you have it on, which comes in handy except if you're about to take a shower.

• **Pen-based computing.**

Pen-based technology threatens to get rid of the keyboard all together and everyone you see at Comdex will be pretty excited about it . . . except for the guys in the booth with those Velcro laptop keyboard pouches.

• **Voice recognition.**

This is the hottest technology of all. Get there early if you want to see the ultimate in high-tech: a computer that actually understands what the customer is saying.

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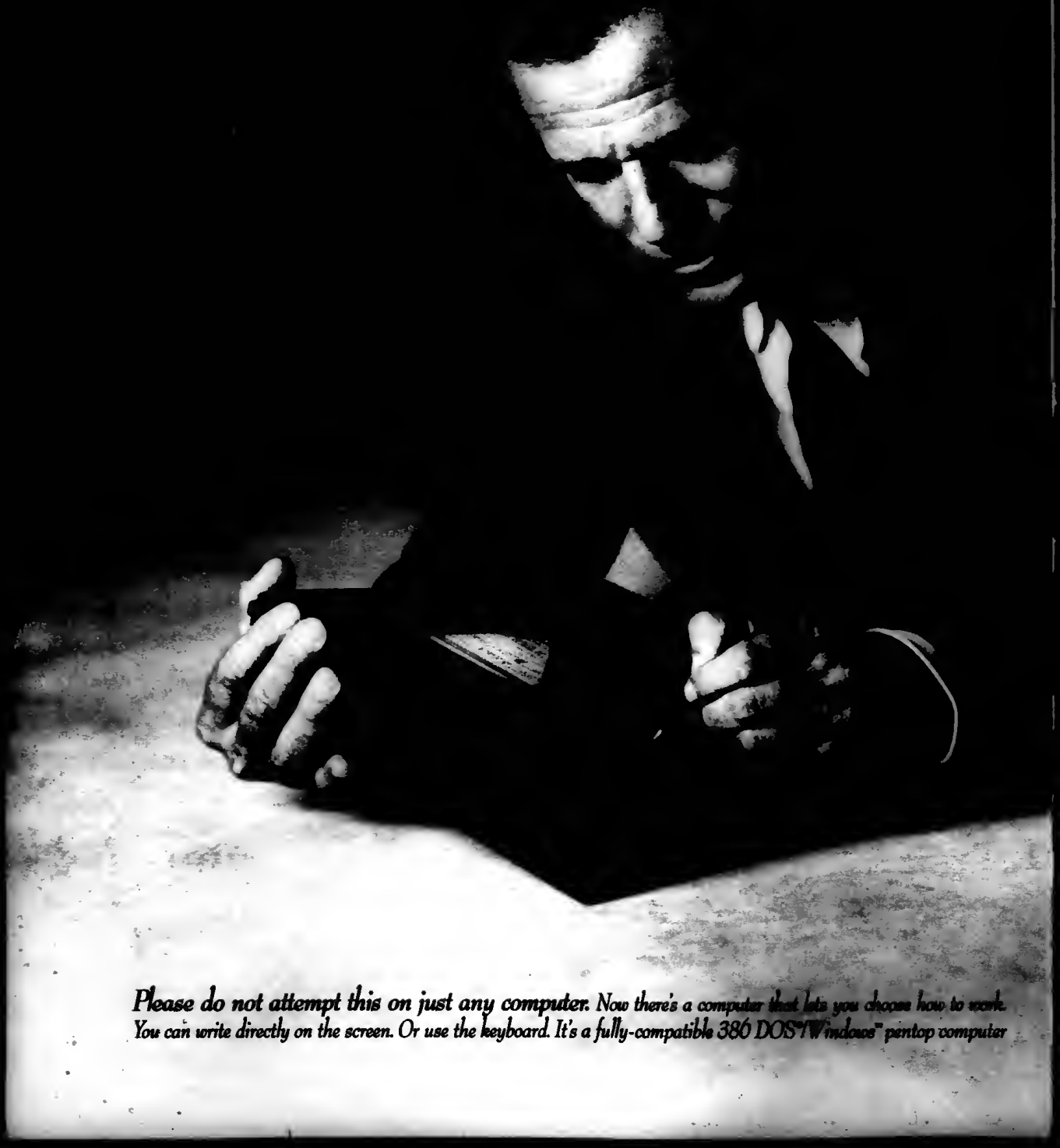
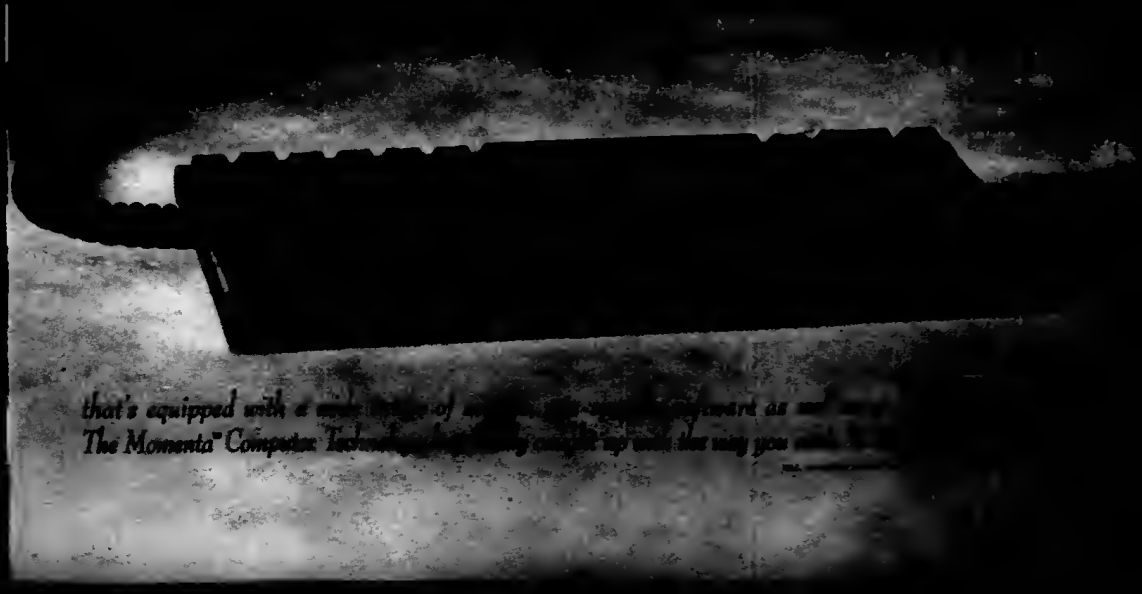
Cohn is trying to be a computer salesman in Atlanta.



Please do not attempt this on just any computer. *Now there's a computer that lets you choose how to work. You can write directly on the screen. Or use the keyboard. It's a fully-compatible 386 DOS/Windows™ pentop computer*

MOMENTA



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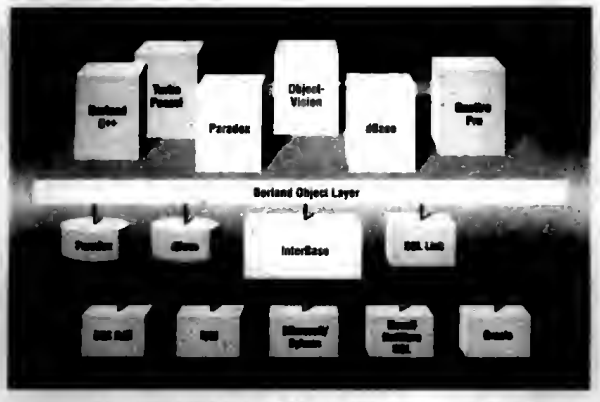

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*1991 J.D. Power and Associates' Computer End User Satisfaction Study. Phase I. Office-Based Small to Medium-sized Businesses.℠ Responses from Business End Users at 1,784 Business sites. Small to medium-sized businesses were based on office sites with between 1 and 499 employees. 1991 J.D. Power and Associates' Computer End User Satisfaction Study. Phase III. Office-Based Large Businesses.℠ Responses from Business End Users at 1,094 Business sites. Large businesses were based on office sites with 500 or more employees. J.D. Power and Associates is a service mark of J.D. Power and Associates. †Dealer prices may vary. Upgrade pricing good in U.S. and Canada only. Borland is a registered trademark of Borland International, Inc.

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SOFTWARE SHORTS

Feds vote yes on GIS

The U.S. government has a vision, and it is increasingly using geographic information systems (GIS) to express it. Of the 110 federal agencies surveyed, 95 now use or plan to install GIS applications during the next few years, according to a report from Input, Inc., a Vienna, Va.-based research firm. Input predicted a 22% compound annual growth rate for federal use of GISs over the next few years.

State and local governments have spent nearly as much as the federal government on GIS, Input reported.

Although AT&T's Unix System V remains most popular, SCO Unix was a hit this year among members of Uniforum, a society of Unix users. In a recent Uniforum survey, almost 38% said they use The Santa Cruz Operation's Unix. Compare this with last year, when so few said they used SCO Unix that it was listed in the "other" category, which comprised about 15% of Unix users, with 25 other vendors.

New Yorkers fond of IBM's DB2 have a user group option — the New York Metro DB2 Users Group. IBM, Bachman Information Systems, Inc. and Platinum Technology, Inc. are sponsoring the group, which planned to hold its first meeting last week.

NCR Corp. and Pacheco, Calif.-based Century Analysis, Inc. (CAI) signed a $25 million joint marketing agreement that gives NCR marketing rights to CAI's CL/7, an application development tool, and CAI-Net, which lets Unix machines work together as peer processors to move multiplexed communications traffic across local-area and wide-area networks. NCR will sell these packages with its System 3000 workstations.

CA makes its CASE with developer tools

BY JOHANNA AMBROSIO
CW STAFF

ANAHEIM, Calif. — In what represents a significant strategy shift for Computer Associates International, Inc., the company has announced software development tools that will work with other vendors' database management systems as well as with its own.

The new products include two acquired packages for workstations, a SQL query management system and a design and analysis system.

Also new are an Application System/400 development tool and software to analyze Cobol programs, both of which CA developed internally. The company made the announcements at a user group meeting held here, which was attended by 2,400 customers.

Most of the packages will be generally available within a year for users of CA's IDMS and Datacom DBMSs as well as for users of CA DBMSs running on Digital Equipment Corp. computers and Unix-based systems, according to Russell M. Artzt, CA's executive vice president of research and development.

About six months after general availability for CA users, he said, the software will be able to work with IBM's DB2 and other DBMSs such as OS/2 and Sybase. The precise timing of support for systems after DB2 would depend on "customer demand," Artzt said.

"This is a change of direction for CA," he continued. "Other databases and other environments are very important to us. They're strategic to what we want to do."

Mark Wasilko, CA's senior vice president of marketing, said, "There's no question that these products are going to be important. They will change the revenue breakdowns of CA," although he would not say by how much or what the company's goals are.

CA users said the tools are very important to them because they are not able to get computer-aided software engineering (CASE) packages that work against CA database management systems from other suppliers.

"We don't appreciate being shut off by IBM's business partners," said George Emmanuel, MIS program manager for the Training & Support Systems Group at Hughes Aircraft Co. in Long Beach, Calif.

Emmanuel, who is also chairman of the Information Users Association, a CA user group, said, "We're getting tired of asking for [other] vendors to support IDMS and Datacom."

CA executives said the product announcements represent the beginning of CA's CASE strategy, although they were not yet prepared to discuss that strategy. "Some of it depends on the Pansophic deal, and that hasn't closed yet so we can't talk about it," Artzt said. Pansophic's tools include the Telon main-

Continued on page 32

What's on the menu?

Computer Associates' new products include the following:

- CA-Q by X, a Microsoft Corp. Windows-based SQL management system that supports both commands and query-by-example for end-user data retrieval. In addition to working with CA's and other databases, Q by X will also be integrated with the Compete modeling package. Norsk Data originally developed Q by X, which will go into beta testing in the fourth quarter and will cost $14,000 for the first eight copies.
- CA-Cobolvision, a Windows-based Cobol analysis tool that runs on a workstation but does the analysis on a mainframe and then downloads the results. It allows programmers to look at different parts of a program and search by verb. This goes into beta testing in January; a debugging portion will be added later next year.
- CA-Ideal/400, a PC-based system for developing AS/400 applications that are integrated with IBM's SQL/400 DBMS. This tool is based on CA's Ideal fourth-generation language. Pricing and availability information were not available.
- CA-Conceptor, a PC-based software design and analysis package that will become Windows-based. The package is currently in beta testing for IDMS 8.0 users and in November will go into beta testing for IDMS 12.0. CA-Conceptor is a graphical system that supports all popular development methodologies, the company said. It will also be priced at $14,000 for the first eight copies.

JOHANNA AMBROSIO

Hospital finds aid in open systems move

ON SITE

BY SALLY CUSACK
CW STAFF

ATLANTA — Piedmont Hospital, sprawling across 22 acres along famed Peachtree Road, is dependent on Data General Corp.'s proprietary MV systems to process all its patient-care needs. As it evolves toward the future, however, Piedmont plans to lean heavily on its software vendor — HBO & Co., based here — to help it cross the bridge to open systems.

Bill Dotson, vice president of management information systems at Piedmont, predicted that the 500-bed, acute-care hospital will have fully automated patient records within 10 years. This will most likely incorporate imaging, technology and other methods on a variety of hardware platforms.

"Achieving this type of total automation — from admissions through doctor's chart annotations to billing — will require some type of open systems environment," Dotson said.

He said he believes that HBO will be close to offering that type of automation within 10 years.

Piedmont currently uses DG's top-of-the-line MV/40000 as the centerpiece of its patient-care systems configuration. The system, running under HBO's proprietary Starbase operating system, is responsible for processing all admission, registration, nursing, medical records, abstracts and ancillary support activities within the hospital.

There is another MV/40000 used solely for patient accounting records, an MV/20000 for radiology management, an MV/20000 for the pharmacy and an MV/18000 running a laboratory management system.

With the exception of the MV/18000, all use HBO software applications.

HBO offers the Star family of integrated products primarily on DG's proprietary MV platform as well as on its newer Unix-based Aviion line of workstations and servers.

HBO has more than 200 clients, and the company is in the process of migrating another customer site from the MV to the Aviion architecture.

Pilot project with HP

The vendor is also piloting a project with Hewlett-Packard Co., running HBO software in an HP Unix environment on the HP 9000 minicomputer.

"Installing a hospital information system is complex, and we are committed to keeping this current," Dotson said, adding that the software is upgraded at the rate of two releases per year.

Confident that HBO has developed a migration strategy that will move Piedmont to Unix platforms in the future, Dotson spends most of his time concentrating on the issues at hand.

While the hospital has an eye toward implementing totally integrated open systems architecture within the decade, Dotson said end users are the primary force determining technological innovations today.

One of the ways that IS responded to end-user needs was to develop a DOS-based executive information system (EIS) in-house for use by the hospital's executive vice presidents.

Using a point-and-click interface on standard Intel Corp. 80286- and 80386-based machines, the EIS allows for statistical and budgeting information evaluation daily. Files can be updated, and graphs and charts can be added.

"The user is pushing us," Dotson explained. "The public is becoming more computer literate these days — the demand is out there as fast as we can react to it."

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IS eyes business intelligence

Computer systems play central role in competitive intelligence efforts

BY MARYFRAN JOHNSON
CW STAFF

Competitive intelligence — the corporate art of snooping on your rivals — has long been the province of the marketing department rather than the data center.

Yet this expanding field of business intelligence gathering has come to rely so heavily on computers that information systems managers are finally paying attention to its potential, users and industry experts agreed.

A recent survey of 225 Fortune 500 companies, conducted by Fuld & Co. in Cambridge, Mass., highlighted the use of computer software and hardware as organizing tools for building such systems.

"Corporate management has woken up to this subject as critical to them," said Leonard Fuld, president of Fuld & Co. "We found that MIS people are getting more involved in selecting the software and hardware."

Business intelligence draws its picture of the competition from a grab bag of information: Magazine and newspaper articles, annual reports, commercial on-line databases such as Nexis and simple word-of-mouth information gathered by the sales force or marketing representatives.

Fresh info

Getting the goods on competitors is of little use, however, without some way to organize the information, access it and keep it fresh.

"Too many companies are not coordinating this effort internally. You find five, 10 or 20 different databases being built up," Fuld said. His survey found that users of business intelligence systems look for three main qualities: ease of data entry, user-friendliness and system expandability.

The survey also showed a steadily rising use of computer-based systems in company intelligence programs. In 1983, only 31% of the respondents used such systems; now at least 44% are employing them.

"Wake up, IS. This is not a niche," said Gary Roush, manager of information management in Corning, Inc.'s corporate marketing department. "IS is now beginning to realize that full-text search and retrieval is very important. Text is 80% of what managers need to make decisions, but IS people spend most of their time in the other 20%, in numbers."

Making business intelligent

Fortune 500 companies rate the qualities of business intelligence systems

Ease of data entry	4.52
User-friendliness	4.42
Expandability	4.16
Network capability	3.99
System response	3.89
Maintenance costs	3.47
Best in class	3.37
Graphics	3.32
Artificial intelligence	2.54

300 users polled (scale of one to five with five being the most important)

Source: Fuld & Co. CW Chart: Janell Genovese

Corning has one of the most widely admired and emulated business intelligence systems in the U.S. The 5-year-old Information Exchange is built on a network of Digital Equipment Corp. VAXs running All-In-1 office automation software, a DEC videotext application and Henco Software, Inc.'s Synchrony text database software.

"This was a computer system designed outside of IS by marketing people, using customer input very literally," Roush said. "Employees can input information through electronic mail and then view it through videotext, but Synchrony is what ties the two together."

The relationship between Corning's corporate marketing and IS departments has recently begun to change, he noted. Programming work that was once subcontracted to outsiders is now done in-house.

The Fuld study found that an overwhelming 87% of the companies surveyed were using off-the-shelf database management software or company-written applications.

The remaining 13% were trying the relatively new intelligence-specific software, which only a handful of software vendors offer.

Among the vendors targeting this market with text-retrieval and database products are Henco Software, Information Dimensions, Inc., Quest Management Systems, Inc. and Sandpoint Corp.

Lotus Development Corp.'s Notes work-group software also has a future in business intelligence, said Neil Lieberman, a director in the consulting services group at Lotus. Several customers are using Notes for competitive intelligence systems now, and Lotus uses the product internally that way, he added.

Phillips Petroleum, Inc. in Bartlesville, Okla., is two years into building its IBM Personal Computer-based competitive intelligence system, using an in-house-developed executive information system as the technology base.

"I'm not saying we've saved the company millions, but we have helped our executives better understand what's going on in the external environment," said Don Colmenares, manager of business intelligence.

Kudos aside, USL deal may not yield all ACEs

BY JOHANNA AMBROSIO
CW STAFF

The announcement earlier this month that Unix System Laboratories, Inc. (USL) had joined the Advanced Computing Environment (ACE) initiative garnered generally positive reaction. However, some skeptics warned, it may not be the panacea for all the open systems movement's ills.

The deal's backers said the move could quell some of the discord among Unix factions and add to the Unix applications portfolio. Under the agreement, USL will merge its System V Release 4 — the most installed strain of Unix in the marketplace — into ACE's operating system.

With System V Release 4 in the mix, the Unix portion of the ACE operating system — due next year — will be able to run applications written for Digital Equipment Corp.'s Ultrix, the Open Software Foundation's OSF/1 and System V Release 4.

However, some industry watchers said that the deal by itself would not be enough to remove the technical barriers to reconciling what one observer counted as 200-plus Unix versions. Vendors now differentiate their versions by tweaking a feature here or adding a function there, and users must recompile applications to move them from one Unix strain to another.

This, in turn, has prevented applications vendors from being able to introduce shrink-wrapped packages that can run unchanged from Unix version to Unix version and is generally believed to be impeding users' acceptance of open systems because of the lack of applications.

Even with the USL/ACE alliance, some said, this situation may not change. "The challenge to Unix is providing shrink-wrapped software, and I don't know if writing to a common set of application programming interfaces is enough to get there," said Judith Hurwitz, a vice president at Patricia Seybold's Office Computing Group in Boston.

Roy Schulte, an analyst at Gartner Group, Inc. in Stamford, Conn., maintained, "Everyone will still have their own value-add and will continue to differentiate. This [announcement] doesn't really mean much to users, since OSF/1 and System V.4 were already compatible."

Even before the USL/ACE announcement, Schulte said, the developers of the OSF/1 and System V Release 4 operating systems had said they would adhere to the same general set of interfaces, including Posix and the X/Open Portability Guide. This will allow applications written for either operating system to run under the other one, with a recompile.

One of the participants in the ACE/USL agreement expressed some disappointment that the alliance will not serve to bring the various Unix versions closer together. John Paul, director of systems engineering for open systems at Compaq Computer Corp. in Houston, said, "It doesn't add binary compatibility," which, he explained, at least some of the ACE members had been hoping for.

Another unresolved issue is which desktop manager, or user interface, all the ACE vendors will use. When ACE was first formed, the plan was that The Santa Cruz Operation would develop an interface based on IXI Ltd.'s X.desktop system. Now, however, that seems to be in dispute while Compaq and USL hammer out a joint user-interface proposal.

West Coast Correspondent J.A. Savage contributed to this story.

Servio unwraps visual application package

BY JEAN S. BOZMAN
CW STAFF

PHOENIX — Servio Corp., a small object-oriented database firm in Alameda, Calif., announced a new visual applications development tool at the Object-Oriented Programming Systems, Languages and Applications (OOPSLA) technical conference here earlier this month.

At the same OOPSLA conference, Servio competitor Versant Object Technology Corp. in Menlo Park, Calif., said that it will remarket another user-friendly tool.

The new Servio tool, Geode, uses point-and-click methods to build database applications without requiring primary knowledge of standard object-oriented languages such as C++. Rather, Geode is layered on top of Servio's object-oriented database, allowing users to write working applications quickly.

Several key features are a visual program designer, an application designer, a forms designer and a set of systems programming tools. Until now, the market for Servio databases was limited to large information systems shops and systems integrators that could program object-oriented database applications with an earlier set of Servio tools.

Toward broader access

"We are trying to allow a much wider range of people to access object-oriented technology," said Ed Horst, marketing director at Servio. "The benefits of OOP are there, such as reusability, ease of maintenance and productivity. But many OOP languages are difficult for end users to learn."

The Geode tool, available in the first quarter of 1992, is priced at $5,000 for a four-user license. The software will run on workstations made by Sun Microsystems, Inc., Digital Equipment Corp. Decstation and Vaxstation machines and on IBM's RISC System/6000 workstation. A second release, due in the second quarter of 1992, will run on Apple Computer, Inc. Macintosh computers or on IBM-compatible PCs running Microsoft Corp.'s Windows 3.0 or OS/2 with Presentation Manager.

Meanwhile, Versant said it will resell a GE Corporate Research and Development programming tool that will simplify the writing of applications for Versant's ODBMS object-oriented database. The GE OM Tool is a graphically oriented, Unix-based program that can generate several types of code, including C, C++ and SQL.

The GE tool will be remarketed as the Versant Object Modeler. It will be offered in addition to Versant's own computer-aided software engineering tools, the firm said. The Object Modeler will be installed in early-support sites in the fourth quarter of 1991 for Sun 4 workstations. A single copy will be priced at $2,400.

Bull DDA offers users access to open systems

BOS/TP transaction processing monitor links DPX/2 Unix and IBM mainframes

BY SALLY CUSACK
CW STAFF

BILLERICA, Mass. — Bull HN Information Systems, Inc. took steps this month to provide proprietary GCOS customers with software to tap into the open systems world.

Unveiled two weeks ago, Bull Open Software Transaction Processing System (BOS/TP) is a transaction processing monitor that provides cooperative transaction processing between Bull's DPX/2 Unix-based platforms and IBM mainframe environments. BOS/TP is interoperable with AT&T's Tuxedo-based system.

Bull also announced Distributed Data Access (DDA), which provides an Open SQL interface and intelligent gateways from the Bull user to a variety of database management systems. These include Oracle and Ingres on Bull DPX/2, Oracle on GCOS 6 and 7 platforms, IBM's DB2 and IMS on MVS and Digital Equipment Corp.'s RDB and RMS on the DEC VAX platform.

BOS/TP was previewed for users at the annual Bull User Society conference in Tampa, Fla. The vendor also outlined its plans for DDA at the meeting.

Richard French, director of applications services products at Groupe Bull, said DDA will offer read-only access to the other vendors' databases by December.

He explained that the vendor is working on a two-way face commit into the database environment, adding that this particular capability would most likely have success in manufacturing organizations and the public sector.

Jim Hunt, vice president of the Bull user group, said that while many Bull customers are interested in open systems, most are just beginning to ask questions about the Distributed Computing Model, Bull's widely touted framework for enterprisewide distributed computing.

Hunt estimated that over two-thirds of Bull users now operate in a multivendor environment.

While Bull may appear to be slightly ahead of user demand in the open systems software arena, Robert Tasker, a vice president at International Data Corp., pointed out that some parts of DDA are not yet available. DDA will be priced from $2,500 for the base system and $2,500 for each node. BOS/TP with two-level transaction processing application-to-application communication is available immediately, starting from $4,000. BOS/TP with XCP2/LU6.2 cooperative processing is scheduled to ship in December.

TWO-THIRDS OF BULL users now operate in a multivendor environment.

CA makes CASE

CONTINUED FROM PAGE 29

frame-based code generator. Artzt also said that CA is working on object-oriented additions to its two database management systems, although he would not provide specifics or a timetable.

In addition to the new products, CA announced that it has joined the SQL Access Group, a coalition of vendors seeking to standardize data access techniques. Artzt said that in all likelihood, CA will adopt the specification proposed by the group in July.

Furthermore, CA said, the beta-test version of DB2 Transparency for its Datacom system is available.

This allows Datacom users to run DB2 applications without having to purchase DB2.

Next month, Release 12.0 of IDMS will be available; it will provide full SQL support, performance improvements and integrated security. Release 12.0 is currently being beta-tested by 18 users, according to CA.

Also, CA executives said they have announced some statements of direction regarding Ramis, the fourth-generation language that CA recently acquired with Ramis' parent company, On-Line Software International, Inc.

In the short term, Artzt said, CA will provide an option for Ramis users to buy the Viewpoint interface that CA is putting across all its MVS systems software products. It is a Windows-like interface.

Another near-term promise for Ramis users is the integration of CA's Compete workstation-based modeling tool. Ramis users will be able to download information into Compete and then perform what-if analysis.

Down the road a bit, Artzt said, is a workstation version of Ramis and integration between Ramis and more of CA's products. CA said it will provide more specifics about its Ramis plans, including timetables, in December.

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Cobol tools among latest AIX products

BY JOHANNA AMBROSIO
CW STAFF

A panoply of products was unveiled at the recent AIX Expo, which focused on IBM's Unix environment. Among the wares was a software development tool kit for designing AIX applications in Cobol.

Also unveiled were a fourth-generation language (4GL), memory- and port-expansion boards, optical and tape drives and fax and file-sharing products.

The Cobol development tool kit, from Netron, Inc. in Toronto, is a back-end computer-aided software engineering system with a graphical user interface and the ability to save and reuse code in a frame library. The product, called Net ron/Cap, is in beta testing and is scheduled to be available Dec. 1 for $10,000 per user. It will also generate Cobol code for all other environments it supports, including MVS, VM, MS-DOS, VAX/VMS, CICS, IMS and DB2.

Other AIX Expo announcements included the following:

- Recital, a 4GL and database management system, is now available for AIX from Recital Corp. in Danvers, Mass. Recital, which can be used to move personal computer database applications to a Unix environment, is also available for the VAX/VMS environment and 70 Unix versions.
- System Z, a 4GL, is being ported to IBM MVS mainframe systems in a joint-development deal between IBM and Zortec, Inc. in Nashville. As System Z runs under AIX, this will allow users to move applications between AIX and the mainframe.
- Common-Link, file-transfer software from Pacific Microelectronics, Inc. in Mountain View, Calif., allows the IBM RISC System/6000 to exchange files with the Apple Computer, Inc. Macintosh, MS-DOS computers and workstations from Hewlett-Packard Co. and Sun Microsystems, Inc. Other computers will be supported later this year, the company said.
- Trufax from Devcom Mid-America, Inc. Oak Brook, Ill., allows RS/6000 users to send and receive images and text from fax machines or fax-capable computers.
- The DX-6000 series of nine-track tape drives from Interface Data, Inc. in Woburn, Mass., ranges in price from $7,995 to $13,995.
- Serial I/O boards from Equinox Systems, Inc. in Miami, expands the number of RS/6000 communications ports.
- Optical storage products from Ten X Technology, Inc. in Austin, Texas, and Qstar Technologies, Inc. in Bethesda, Md., both have capacities of at least 5.6G bytes.
- Multiport boards for high-performance I/O communications among AIX and other Unix environments from Dickens Data Systems in Norcross, Ga.
- A performance-enhancing board from Digiboard in Minneapolis lets the RS/6000 support 512 concurrent users.

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PLATINUM technology

Cadam draws in CIM links

BY MARYFRAN JOHNSON
CW STAFF

BURBANK, Calif. — IBM-owned Cadam, Inc. recently announced enhanced versions of its Cadam Interactive and Professional Cadam product lines for mainframe and workstation environments.

The improved two- and three-dimensional design, modeling, documentation and data management tools are intended to link Cadam more securely to corporate computer-integrated manufacturing (CIM) strategies, company officials said.

For mainframe hosts, Cadam Interactive Version 3 Release 2 adds a range of new solid modeling features, expanded library management and support for IBM's DB2 and SQL/DS relational database management systems. The software is available immediately and is priced starting at $15,780 for the MVS/ESA and VS/ESA mainframe operating systems.

Raster ready

For use with the RISC System/6000 line of workstations and servers, Professional Cadam Version 3 Release 3 includes new features such as raster image processing and surface blending for 3-D surface design.

With raster processing capabilities, users can now scan and store raster data as part of the Cadam database. This allows users to edit and mix the data with vector data.

The RS/6000 Cadam software is available immediately. It costs $6,000 if purchased before Jan. 1, and $10,000 thereafter.

Cadam President Frank Puhl said the enhanced versions of Cadam software extend beyond design and manufacturing functions for mechanical and electrical parts and into the design and operation of plants and entire facilities.

Cadam, with more than 200,000 users worldwide, was purchased by IBM in January 1990 as part of its expanding interest in CIM.

Pick users test Unix waters

BY SALLY CUSACK
CW STAFF

The hype and hoopla surrounding open systems migration has left no group unscathed. Even fanatical Pick enthusiasts are looking for safe Unix ports to harbor their beloved operating system.

Pick, developed by Dick Pick of Pick Systems, gained momentum in the 1970s for its easy-to-use, easy-to-develop commercial business applications.

The industry's migration toward Unix-based platforms is now causing Pick users to evaluate several of the Pick/Unix-based platforms currently being offered (see box).

While there is classic, or standard, Pick (R83 Pick), several other versions have cropped up, such as Prime Computer, Inc.'s Information and Vmark Software, Inc.'s Universe.

There are now Unix implementations of both these products, allowing users to migrate and retain their software applications investment.

However, people moving from a classic Pick environment may have to struggle to get used to Unix.

"For someone who has totally grown up on the Pick system, Unix will be a totally alien environment," said Lee J. Leitner, a consultant and editor at *Infocus*, a magazine geared to Prime Information users.

Leitner pointed out that Pick/Unix administration is more complex than straight Pick, albeit more flexible.

For example, in standard Pick the user does not deal with volumes on partitioned disks. Pick users are accustomed to initializing a system and having it map the entire disk drive in memory structure.

Other issues in migrating from classic Pick environments revolve around system administration issues, Leitner said.

However, information systems shops migrating from Pick variations, such as Information and Universe, will have a far easier time moving to the Unix world, said Mike Harries, principal at the Carlyle Group, a Pick market research and consulting firm in Framingham, Mass.

The leading Pick/Unix implementations:

- Universe, from Vmark Software, Inc.
- PI Plus, from Prime Computer, Inc.
- Ultimate, from Ultimate Corp.
- Unidata, from Unidata Corp.

Both have administrative functions built into the package that will ultimately ease the conversion process, Harries said. From the end-user perspective, moving from one of these environments over to Unix can be accomplished in the order of days.

The Carlyle Group sees Unix as the fastest growing component in the Pick marketplace — accounting for more than 36% of the total Pick market by 1993. There are currently 1.5 million Pick users worldwide.

While in the past the Pick market was dominated by McDonnell Douglas/Novadyne, Prime, Ultimate Corp. and Adds/NCR Corp., the industry push toward open systems has given Pick users safe Unix choices, including IBM's RISC System/6000, Hewlett-Packard Co.'s 3000 and Digital Equipment Corp.'s VAX systems.

"The application [value-added resellers] are now seeing [is] the ability to offer their applications on HP or DEC systems," Harries said, adding that as the hurdles for resellers disappear, the Pick market continues to grow.

The conversion path to Unix is not without surprises for Pick users, Leitner cautioned. He recommended that those planning a conversion research the Unix operating system before jumping headlong into it.

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NEW PRODUCTS — SOFTWARE

Applications packages

Britz Publishing, Inc. has announced Release 2.0 of its General Ledger software for the IBM System/36 midrange system.

The package's multicompany processing has been enhanced in Release 2.0, and users can select the type of data entry program desired.

The firm also released Forms Control, a form management software system for IBM's Application System/400.

The products are priced at $199 each.

Britz Publishing
Suite 1A
986 Madison Ave.
Madison, Miss. 39110
(601) 853-1394

Imrex Computer Systems, Inc. has announced a financial software system for IBM's Application System/400 platform.

World-Wide Financials includes four modules: General Ledger with Report Writer; Accounts Payable; Accounts Receivable and Collections; and Accounts Receivable Auto Cash with Lock Box. The system is IBM Common User Access-compliant and handles an unlimited number of foreign currencies. Real-time and batch transactions are supported.

Pricing for each module starts at approximately $25,000, depending on AS/400 model.

Imrex Computer Systems
307 E. Shore Road
Great Neck, N.Y. 11023
(516) 466-5210

Cognos, Inc. has released an update of its IBM Application System/400 version of Powerhouse.

Powerhouse is a fourth-generation language. The new AS/400 version includes a 100% improvement in on-line transaction processing speed, according to the company. It also offers improved IBM Common User Access defaults and improved interaction with RPG and Cobol applications.

Pricing is from $8,000 to $132,500, depending on hardware model.

Cognos
67 S. Bedford St.
Burlington, Mass. 01803
(617) 229-6600

Datathon, Inc. has announced the availability of Trainease on the IBM Application System/400.

Trainease is a personal computer-based training software tool. Trainease simulates a live AS/400 application on a PC that is linked to the AS/400 via a 5250 emulation board. It allows the user to work through exercises that simulate a live AS/400 application.

The AS/400 version costs $5,000.

Datathon
19360 Rinaldi St. #310
Northridge, Calif. 91326
(818) 366-1463

Computer-aided software engineering

Michaels, Ross & Cole Limited has announced a major upgrade to the MRC-Productivity Series fourth-generation language tool.

MRC-PS Release 3.1 offers a Template Programming Language and the Smartlinks application integrator for computer-aided software engineering. It also adds new graphics capabilities.

The series runs on IBM Application System/400 midrange computers and is priced between $3,000 and $34,500.

Michaels, Ross & Cole
Suite 203
450 E. 22nd St.
Lombard, Ill. 60148
(708) 916-0662

Utilities

Emphasys Software has released the On-Q report generator for Cross/36.

Cross/36 is an RPG II environment compatible with the IBM System/36 that runs on a number of hardware platforms. On-Q includes an English-language query method, file transfer capabilities and a report writing tool.

Pricing starts at $500.

Emphasys Software
Suite 240
9855 W. 78th St.
Eden Prairie, Minn. 55344
(612) 941-9337

Bernstein & Associates, Inc. has introduced the Response Time Monitor (RTM) for Digital Equipment Corp. VAX systems.

RTM is a software tool kit that provides measurement of interactive response time and identification of resources being used during an interactive response interval. It allows system managers to tune VAX performance and code, the firm reported. RTM requires low system resources and no VMS patches.

Pricing starts at $750 and depends on VAX Units of Performance per site.

Bernstein & Associates
Suite 103
3 Dunwoody Park
Atlanta, Ga. 30338
(404) 392-1488

Intelligenceware, Inc. has announced IXL:The Discovery Machine for Digital Equipment Corp. VAX systems.

IXL automatically finds patterns in existing large databases without requiring user-defined queries. IXL searches can be tailored by the user if desired. The com-

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pany said the product reports findings in an easily understood format.

Pricing on the VAX starts at $7,500.

Intelligenceware
5933 W. Century Blvd.
Los Angeles, Calif. 90045
(213) 216-6177

Systems Center, Inc. has upgraded its Backup.Unet software utility.

Backup.Unet 2.0 automates backup functions in multivendor Unix environments. It provides a new cross-platform graphical interface based on X Window System. The upgrade also includes support for tape jukeboxes and intelligent device selection for unattended backups.

Pricing starts at $7,500 for 10 nodes and is based on the number of disk nodes and the largest processor on the network.

Systems Center
1800 Alexander Bell Drive
Reston, Va. 22091
(703) 264-8000

Training

Berkeley Decision/Systems has announced a video training course for first-time Unix users.

"A User's Introduction to Unix" includes a hands-on tutorial disk, manual and workbook as well as the training video. The course is priced at $295.

Berkeley Decision/Systems
803 Pine St.
Santa Cruz, Calif. 95062
(408) 458-9708

HARDWARE

Processors

American International Devices, Inc. has begun shipping memory upgrades for IBM Application System/400 Model D systems.

Capacities up to 32M bytes are available for AS/400 Models D25, D35 and D45. Pricing is $395 per 1M byte.

American International Devices
12540 Beatrice St.
Los Angeles, Calif. 90066
(213) 305-8161

System Industries, Inc. has boosted the performance of its Rx Relational Accelerator system.

The new Series 3000 model provides Oracle Corp. relational database processing for up to 85 concurrent users in most applications. Transaction processing speed has been improved by 80%, the company said. The Series 300 includes 2G bytes of disk space, 32M bytes of system memory, an 8mm tape drive for software installation and a modem.

Pricing starts at $95,000.

System Industries
560 Cottonwood Drive
Milpitas, Calif. 95035
(408) 432-1212

Data storage

Zetaco, Inc. has upgraded its SCZ-5 Disk/Tape Controller for Data General Corp. MV series minicomputers.

The Controller includes three new software programs: a monitor for small computer systems interface-attached peripherals, an automatic cartridge eject program and a tape formatting utility.

The Controller is packaged with Zetaco's SKM Disk and Tape Subsystems. Pricing for the SKM line starts at approximately $13,000 for a 330M-byte drive with controller and cabling.

Zetaco
11400 Rupp Drive
Burnsville, Minn. 55337
(612) 890-5135

Alphatronix, Inc. has announced rewritable optical jukebox systems for the Digital Equipment Corp. Vaxstation 3100.

The storage capacity of the Inspire for Vaxstation product ranges from 15G to 85G bytes. The line offers a mouse-controller interface and works with an unmodified DEC dk driver, maintaining compatibility with future VMS upgrades.

Pricing starts at $49,900.

Alphatronix
Suite C
2300 Englert Drive
Research Triangle Park, N.C. 27709
(919) 544-0001

I/O devices

Peritek Corp. has announced a high-resolution image capture and display board set for Q-bus systems.

The VFG-Q is available in one- and four-page versions and provides real-time eight-bit video digitization, frame store, zoom and scroll effects and alphanumeric overlay. It can acquire signals from video cameras and videocassette recorders.

Pricing begins at $7,500.

Peritek
5550 Redwood Road
Oakland, Calif. 94619
(415) 531-6500

Equinox Systems, Inc. has announced I/O boards for the IBM RISC System/6000 market.

The Megaport/RS boards provide additional connectivity ports for RS/6000 workstations with continuous 38.4K bit/sec. throughput. Twelve-port and 24-port versions are available, allowing terminals and peripherals to be connected up to 3,000 feet away.

Pricing starts at $1,395 for a 12-port model.

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(305) 255-3500

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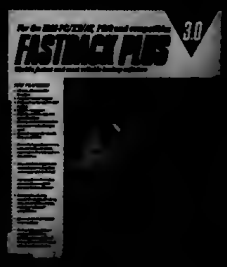

Everyone who uses a PC ought to back up regularly. But most people don't back up at all.

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The color of money

The world is not just black and white, and now neither are $5,000 printers. **Seiko Instruments USA, Inc.**, based in San Jose, Calif., recently introduced what it claims is the first Adobe Systems, Inc. Postscript-compatible thermal-transfer color printer priced at $4,999. The Personal Colorpoint PS laser printer works with personal computers running DOS, Unix and Apple Computer, Inc.'s Macintosh operating system.

Through Dec. 31, **Mozart Systems Corp.** is giving a 50% discount to **Easel Corp.** customers who want to move to development tools from Mozart. Mozart 3.0, a graphical user interface builder, is available for $3,500 to those who present an Easel purchase order dated after Sept. 1, 1990.

To help users get quicker, more reliable service, **AST Research, Inc.** formed a new support program for qualified resellers. Advanced System Support Center focuses on multiuser networked environments and offers resellers advanced training and other features.

Compaq, AST fill server gaps

ANALYSIS

BY MICHAEL FITZGERALD
CW STAFF

Compaq Computer Corp. and AST Research, Inc., in coming out with file servers that plug some holes in their product lines, have also taken a firm step into the future, analysts said.

The companies released new file servers at Networld '91 in Dallas last week, billing the products as important, strategic pieces of their respective futures. For Compaq, it means providing users with an upgradable server for small local-area networks at considerably less expense than the high-end Systempro. For AST, the powerful new file servers are intended to bring the company one step closer to being more than just another personal computer company. Analysts said Compaq will reap benefits before AST does.

AST's Premium SE 4/33 *file servers step beyond its current product line*

"This market [high-level file servers] is growing much slower than anybody expected," commented David R. Korus, PC analyst at Kidder, Peabody & Co., commenting on the AST line. "It remains to be seen when we will get acceptance of this kind of product."

Korus said Compaq's announcement, on the other hand, "encouraged him" about Compaq's near-term product strategy.

"I think [Compaq] has made a smart decision," agreed William Bluestein, a senior analyst at Forrester Research, Inc. in Cambridge, Mass. "They're going to grow with the PC LAN, rather than try to drag people up to the Systempro."

Compaq may have put itself in contention for bids at even the most price-sensitive accounts.

"We would test it, and we might feel good with something like that," said Glen A. Nallenweg, IS/Systems & Networks for National Steel Corp.'s Midwest division in Portage, Ind. National Steel plans to use LANs in the future, although it is watching its spending in 1991.

Analysts also said Compaq's announcement strengthened it with respect to IBM, which has seen its Personal System/2 Model 95 do well in the server marketplace.

"Compaq is bettering IBM with a range of uniprocessor-based servers and then continuing to better IBM on its multiprocessing approach," said John Dunkle, vice president of Workgroup Technologies, Inc. in Hampton, N.H.

AST's Premium SE 4/33 line of file servers includes its first disk array technology, offering a redundant array of inexpensive disks, or RAID, Level 5 product, optional 32-bit Extended Industry Standard Architecture Token Ring and Ethernet adapter cards and an optional tape back-

Continued on page 67

Pen-based computers poised for Comdex debut

BY JAMES DALY
CW STAFF

After months of lofty promises, pen-based personal computer makers will finally strut their stuff at this week's Comdex/Fall '91, and users are taking note.

Although many of the devices will not be available until early next year and some are still only working prototypes, users will finally be able to get their hands on the ballyhooed machines.

Many users are already excited about the prospect of working with machines that use an electronic stylus to enter data. "People look at pen-based machines and go 'Wow' — I've been in this industry for 21 years and that's the first time I've heard that," said Norman Vincent, vice president of data processing at State Farm Mutual Automobile Insurance Co. The insurance giant is testing pen computers among its claim adjusters who would use them in making damage assessments.

Pens on parade

Among the pen-based models on display will be the following:

- Dauphin Technology, Inc. in Lombard, Ill., will show two pen-based portables. The first weighs under 5 pounds, features an Intel Corp. 80386 chip and includes 1M byte each of random-access memory and flash memory. The second model is a higher powered unit boasting a 60M-byte hard disk, 4M bytes of RAM, flash memory and an external keyboard, mouse, floppy drive and external monitor. The machines will be available in the first quarter, but no prices have yet been set.
- PI Systems Corp. in Portland, Ore., could establish itself as the frontrunner in providing the lightest and lowest price pen-based PC entry with the Infolio. The machine is expected to weigh less than 3 pounds and

Continued on page 66

Micro Focus brings 370 Assembler to the PC!

The Micro Focus 370 Assembler is a tool which helps maximize the productivity of both the mainframe Assembler programmer as well as the COBOL programmer whose application calls Assembler subroutines.

Micro Focus 370 Assembler allows PC development and maintenance of host based Assembler and mixed COBOL/370 Assembler applications when used with Micro Focus COBOL/2 Workbench. The full featured Assembler programming environment includes:

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- ❑ Linkage Editor
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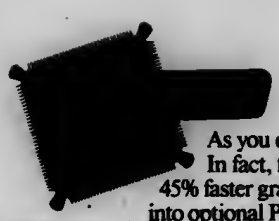

Our 68020 processor and high-speed ports leave the other guys in the dust.

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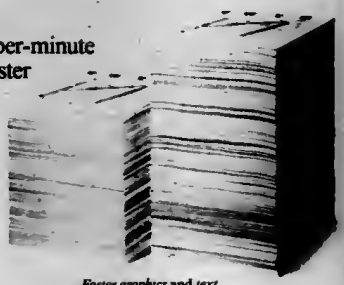
LaserPrinters

As you can see, this is a printer with legs. In fact, for the new IBM LaserPrinter 10, 45% faster graphics is just a warm-up. Shift into optional PostScript® mode, and it's a full two-and-a-half times as fast as the LaserJet® III in PostScript mode, *on average.* The tougher the page, the more time you save.

At the heart of the new LaserPrinter 10, a Motorola® 68020 processor crunches through complex graphics. A 10-page-per-minute engine prints plain text 25% faster than the LaserJet III. And high-speed ports accept data up to 15 times faster, to unjam busy LANs.

If you're wondering how all this speed fits into your system, don't. Every new



Faster graphics and text mean more work, less wait.

Speed comparisons based on captured, compressed image data files. PostScript files sourced from Microsoft® Soft Print® test case, running files captured from output of application drivers. Motorola and the Motorola logo are registered trademarks of Motorola, Inc. WordPerfect is a registered trademark of WordPerfect Corporation. Windows 3.0 is a registered trademark of Microsoft Corporation. Lotus is a registered trademark of Lotus Development Corporation. Adobe and PostScript are registered trademarks of Adobe Systems Inc.

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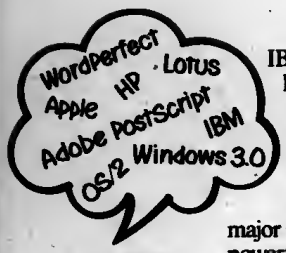

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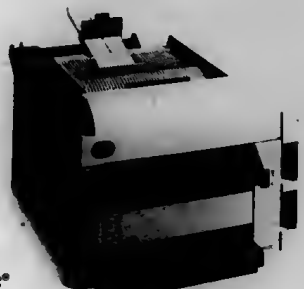

The IBM LaserPrinter 10, one of four new LaserPrinters.

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IDC WHITE PAPER

INTEROPERABILITY:
CORNERSTONE OF OPEN SYSTEMS

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Since its founding, the Open Software Foundation has provided a vehicle for the evaluation, selection, and development of the best technology to make open systems a reality.

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Interoperability: Cornerstone of Open Systems

INTRODUCTION

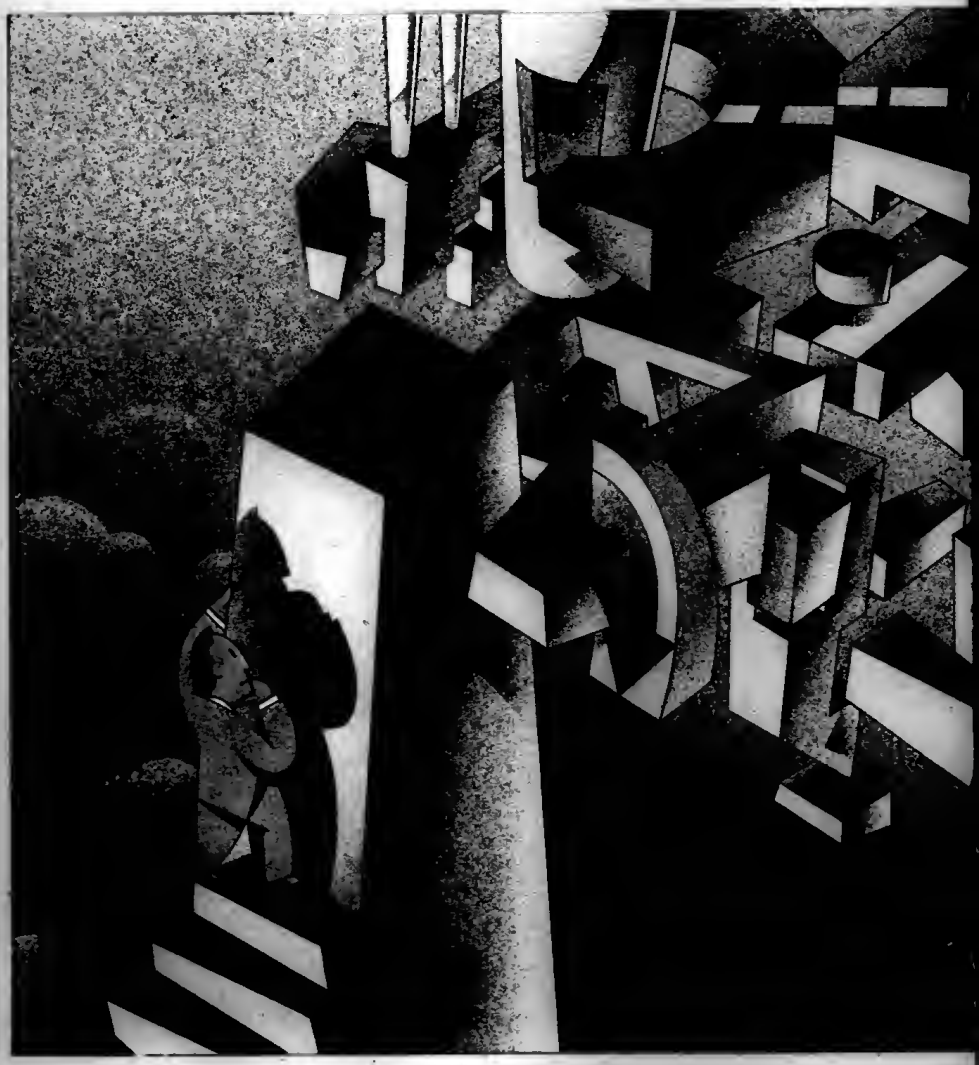
"Interoperability" and "open systems" are terms commonly and loosely used in conversations about computing. These terms slip smoothly off the tongues of both vendors and users alike. Vendors like to say their systems are interoperable, or better yet, open. Users say they want to be interoperable and open, but don't believe it will happen soon.

When all the talking is done, however, the emergence of open systems is dependent on a new generation of sophisticated users seeking solutions to their application requirements. This new generation of users has wrested control of computing away from the vendors who controlled the industry during the 1960s and 1970s. And they intend to maintain it. The 3.5 billion users expected to be on-line worldwide by 2000 will have the power to build open systems that conform to their needs.

The new user predominance will be vastly diluted, however, if users fail to control the changes reshaping the IT industry. And in this endeavor, they must enlist the services of vendors, for there can be no effective control of growth without an innovative stream of new tools. It is also necessary to integrate these new tools into existing systems with minimal disruption.

Unix will play a prominent — but not paramount — role in the world of interoperability and open systems. Designed with microprocessor-based systems in mind, and familiar to a high percentage of students, it will continue to play its role as a locus of innovation.

Just how soon interoperability gives way to open systems remains to be seen. Given tools such as networks, computer-aided software engineering and systems management, that day is approaching more quickly than ever.



INTEROPERABILITY: CORNERSTONE OF OPEN SYSTEMS

AT THE SIMPLEST LEVEL, IT MEANS VASTLY IMPROVED RESOURCE SHARING. AT A GRANDER LEVEL, IT MEANS INVESTMENT PROTECTION. AT THE GRANDEST LEVEL, IT MEANS ENABLING NEW WORK STYLES. ■ "IT" COULD BE OPEN SYSTEMS. OPEN SYSTEMS MAKE CONCEPTUAL SENSE. BUT REALITY INTERVENES. OPEN SYSTEMS, LIKE THE DREAMED-OF HIGH-SPEED TRAINS THAT LEVITATE ABOVE TRACKS BUILT WITH HIGH-TEMPERATURE SUPERCONDUCTORS, REMAIN ON THE PERIPHERY OF POSSIBILITY. ■ INSTEAD, "IT" IS INTEROPERABILITY. WHEREAS THE GRANDIOSITY OF OPEN SYSTEMS IS DAUNTING, THE PRACTICALITY OF INTEROPERABILITY INVITES ACTION. FASTER TRAINS ARE EASIER TO COST-JUSTIFY, SIMPLER TO BUILD AND MORE CERTAIN TO BE INCORPORATED INTO SOCIETY IF THEY RUN ON EXISTING TRACKS. OTHERWISE, ENTIRE NEIGHBORHOODS MUST BE LEVELED. ■ THE DIFFERENCES BETWEEN INTEROPERABILITY AND OPEN SYSTEMS ARE SUBTLE. THE TECHNOLOGY OF INTEROPERABLE SYSTEMS

Interope

THE BIG PICTURE IN O

PEN SYSTEMS
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allows them to communicate across previously incompatible aggregations of hardware and software with a minimum of human intervention, usually in the form of specialized tools placed at network junctures. The value of open systems technology is found both in its availability and its diversity. Its availability allows it to interoperate across a wide spectrum of systems, while its diversity gives it unlimited ability to service new and innovative applications.

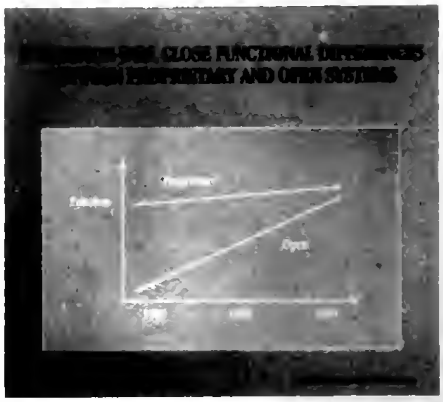
New technologies offer the potential to increase productivity. But existing technologies are essential to completing work that needs to be done now. "Out with the old and in with the new" might be a reasonable strategy in some cases, but not in the case of information systems. Needed at once are strategies that increase the utilization of existing resources and also facilitate the adoption of more productive technologies. Succinctly stated, the new must be made to interoperate with the old.

This does not mean that interoperability and open systems are incompatible goals. The pursuit of interoperability generally leads further down the path toward open systems. And it is likely that, when open systems are finally realized, they will be built largely on a foundation of interoperability.

Interoperability requires planning, commitment, resources, and, like most changes, involves risks. But a reasonable interoperability strategy that does not engender huge disruptions can improve the productivity of existing information technology (IT) investments. It can also enable new application forms and ultimately pollinate mature or budding information systems with new technologies.

The computer industry is going through a painful but necessary transition. Four factors are driving this transition:

- an increasingly large number of users
- increased user sophistication
- new software standards that are creating the potential for an explosion in application innovation
- new modes of processing, characterized by their close integration with user firms, i.e. airlines reservation systems.



As users apply their ingenuity to their IT systems, the results will eventually spread across a wide range of user systems, making them truly open.

THE CRUX OF OPEN SYSTEMS

What constitutes an "open system" is one of the most controversial topics in the computer industry. Yet upon close inspection, many opinions that on the surface seem so different have much in common.

Some claim that open systems are synonymous with Unix; that the presence of Unix is a necessary and sufficient condition of open systems. Thus, in their view, all Unix hardware, software, communications, applications, vendors, etc., are open. Anything not Unix is not open, and therefore, is bad. The implied message is, "Throw it all away and start from scratch."

Others believe that open systems are a dream; that the open systems market will never be able to completely match the portfolio of tried-and-true technologies available from proprietary vendors. Specifically, they maintain that Unix is unable to supplant other entrenched operating systems such as MS-DOS and MVS. This view, however, is less a criticism of open systems and more a reflection of bias against Unix.

As is the case in almost all disagreements where passions play, both sides are somewhat correct. Certainly it is hard to imagine open systems without Unix. It is also hard to imagine open systems built on Unix only. What seems most likely to happen is that users will find intelligent ways to employ non-Unix technologies in their installed systems.

One way to gauge the importance of Unix in today's computing world is by assessing its size in the overall IT market. IDC believes that the current asset value of all equipment, software and expertise in the U.S. alone is more than $500 billion dollars. In this accounting, expenise is defined as staffing costs and dollars spent on third-party services. Just looking at the slice of the asset pie accounted for by operating systems, Unix constitutes only 10% of the $193 billion segment. This illustrates that open systems will embody more than just Unix. If they didn't, some $180 billion worth of equipment could become obsolete.

In IDC's view, the crux of open systems is the newfound ability of users to choose the right technologies to solve their application requirements. Open systems are not about products being sold, or standards being published, or volumes being distributed. Open systems are about choice: customer choice. In IDC's opinion, open systems are things to be built — and customers are the builders.

Ten years ago, much of the industry's expertise was on the supply side in the hands of vendors. These vendors were able to regulate rates of innovation. In this regulated environment, product cycles were long and generally stable.

Back then, users were much less knowledgeable about computer technology and how it would be employed. As a result, they followed vendor delivery schedules. When their supplier said, "New stuff; much better; time to buy;" customers did.

A lot of the mystery has been taken out of computers in the last 10 years as the possibility of open systems became more realistic. Not only have customers gotten smarter about technology, they have become far more knowledgeable than their suppliers about how technology is, and should be, harnessed in their company.

This has led to a situation where, for

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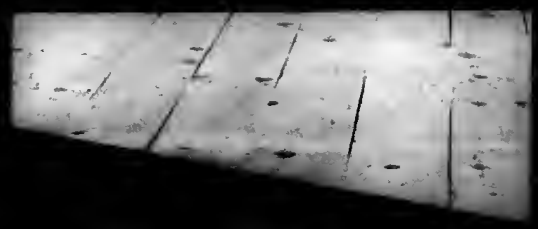

Everyone agrees they're

No one's debating whether open systems are a good idea, but you'll hear plenty of discussion about what open systems *are*.

Some insist, for example, that an open system is a UNIX® system. But to others it's whatever it takes to get their different operating systems, networking protocols and databases working as one, and the sooner the better.

That's why IBM views open systems so openly. To us, they begin less with particular technologies and more with the needs of your business.

The real goal is to liberate information that's trapped around your company, so more of your people can use it more easily, and to open commu-

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good, but not everyone agrees how to get there.

nications with customers and suppliers, who no doubt planned their systems without thinking about yours.

And of course, you need to accomplish all this without scrapping your existing multivendor investments.

So the paths to open systems will vary, but there's one thing that won't—consistent industry standards. IBM is fully committed to open systems, so we're equally fervent about standards.

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the first time, users are the strongest force in the computer industry. Emboldened and enlightened, they are leveraging their power as they shop for technology. From this position of strength they are demanding three things:

- control over their information systems now and in the future
- facile technology transfer
- protection of existing information/technology assets.

IDC has developed the "Open Systems Cube" to depict the relationships among these goals.

On the Y-axis we place the degree of customer control. As customers gain control over their systems, they are in a better position to maintain system availability and lower their reliance on individual suppliers for new technologies. In this environment, portability and scalability are essential to increasing customer control.

On the X-axis we place facile technology transfer. The easier it is for the information system to adopt new technologies, the more open the information system.

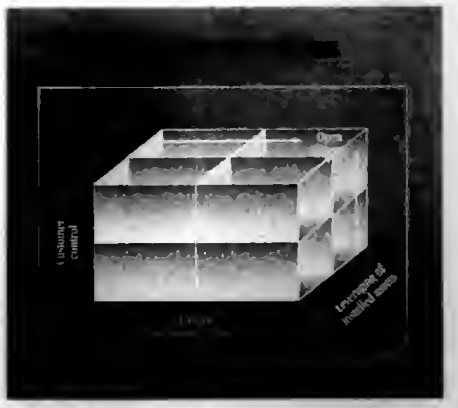
On the Z-axis of the Open Systems Cube is the third — and too often discounted — aspect of open systems: the degree to which the system affects existing assets. Introducing new technologies into an existing system is made especially difficult if, in the process, large portions of old technologies must be replaced. The issue is not trading device for device, e.g. a color terminal for a black and white terminal, but replacing expensive support hardware and software, such as controllers, system software or entire CPUs. A system is more open if productivity enhancements are not solely limited to the introduction of new devices at the expense of old, but also derive from enhancements to existing equipment as well.

The three goals of open systems — control over information systems, facile technology transfer and the protection of current IT assets — are not necessarily mutually supportive. Serious tradeoffs are present. For instance, customer control implies stability in the system, whereas low-adoption barriers imply flexibility and ease of change. Moreover, a customer's ability to make changes may be constrained by the existence of mature installed technologies. In the real world, customers are wedded to certain suppliers. Does that mean that users should throw up their hands and be dominated by the status quo? Of course not. What it means is users must pressure their installed vendors to deliver new, more productive tools.

There is another critical issue related to interoperability and open systems. With increasing frequency, users want to create larger, more complex information systems from smaller, easier to maintain, and in many cases already stable ones. This trend is an example of users turning to interoperability as a means of increasing complexity while maintaining control.

Interoperability is different from open systems in one critical way: it is within reach while open systems remains elusive. Like open systems, however, interoperability must, and does, address control over information systems, facile technology transfer and the protection of existing IT assets.

Interoperability increases customer control by increasing the pool of available technology options. It does not, however, require portability, scalability and other more restrictive measures. All that is necessary is that systems can be combined when, and as, needed.



Customer control, ease of technology transfer and leveraging installed assets must all be heightened in the quest for open systems.

Interoperability aids facile technology transfer and abets lower technology adoption barriers through its dependence on standards.

Interoperability helps users exploit their existing base of assets by being open to the development of new technologies that are compatible with installed systems. To this end, IBM is laboring to improve its S/370 support for a range of technologies from the mundane, like TCP/IP, to the marvelous, like Open Systems Interconnection.

COMPONENTS OF INTEROPERABILITY

Interoperable systems are composed of several contributing elements and characteristics. They include:

Networks. To interoperate, autonomous systems need some sort of network to pass messages, data and control. The network serves two purposes. First, it provides the means by which systems communicate and synchronize work. Second, it enforces security measures, ensuring that integrity problems in one system do not corrupt another. The more complex the interconnection, the more the network must facilitate communication. And, the more functional the network, the more interoperable its systems.

Heterogeneous interconnection. Interoperability usually implies the aggregation of IT resources from numerous suppliers into a single coherent system. Of course, this is not always the case; sometimes getting IT deliverables from an individual supplier to work together is often challenging by itself.

Standards. Heterogeneous interconnection and networking are easiest where standards are in place. And by standards IDC does not solely mean "things that are manufactured in volume" or "industry driven," but rather functional, stable, and well documented principles of operation. Given users' increased sophistication and the proliferation of standards, users now have the option of choosing the standards that will help them the most. Some of the most important standards are data languages

Interoperability: Cornerstone of Open Systems

such as SQL and networking standards like OSI or OSF's DCE. Equally important are common user interfaces, especially graphical user interfaces, which make hardware components, program tools and overall systems look similar. These interfaces raise interoperability above the machine-to-machine level.

It is not important that all standards come from sources outside user organizations. Users both large and small are independently establishing interoperability standards to support their own processing needs. It may not be as inexpensive as adopting commercially available standards, but some situations require more specialized function, but no less stable definition. What is important is that standards, whether commercial or proprietary, evolve to support an information system's ongoing requirements.

Unix's relatively small piece of the overall operating systems pie shows that it is not the ultimate key to open systems.

Flexibility. Interoperable systems are not in constant contact with each other. Given the costs of network bandwidth, it is most desirable that they employ network resources only when necessary. The only time interoperating systems need to be synchronized is during transaction processing. The rest of the time they can be dedicated to other work.

Control. If there is one issue that cannot be stressed enough, it is the importance of control. Because of their dynamic nature, interoperable systems require special attention. Security must be enforced to maintain integrity not only of the combined entity, but of each autonomous system as well. Even more importantly, the personnel and procedures employed to control interoperable systems must be flexible enough to accommodate abnormal periods of interoperation.

Management. Interoperability is not a product, or an architecture. Like open systems, interoperability is what the customer makes it. As with open systems, a principal tenet of interoperability is choice — deciding which technologies to buy at which price, and from whom. But with greater choice comes greater responsibility.

IT suppliers today have only begun supplying highly-functional interoperability in their products. Few are selling anything like "shrink-wrapped" integration. If users want more than intermediate levels of interoperability, they either have to take control of customized integration themselves or be willing to pay someone to customize their systems. If they do it themselves, they must underwrite the risks. Many feel these risks are ultimately less costly than choosing a vendor solution.

Risk and uncertainty, however, have always been present in the IT industry. They have not, however, been unsurpassable barriers. As users overcome them, they become increasingly computer-literate and bolder in their exploration of application possibilities. This aggressive spirit has had a strong impact on the industry.

For example, the tremendous demand for Lotus 1-2-3 during the mid-1980's was instrumental in driving the market for DOS-based personal computers. Indeed, 1-2-3 became so widely installed that it was jokingly suggested that not only was it the number one spreadsheet package, but also the number one word processing package as well. Not satisfied to do only spreadsheets, curious and persistent users successfully transformed 1-2-3 into something it was not originally intended to be.

The case of 1-2-3 is illustrative of the user-level innovation that is a major attribute of interoperability.

The challenge of providing users with the power to innovate and interoperate is substantial. Single-user stations defined by physical proximity are far simpler to conceptualize, build and manage than multi-user stations defined logically by the limits of networks. These single-user stations are also, however, far less powerful, which does not endear them to corporate computing environments.

Given the demands for more sophisticated capabilities, the goal is to provide users with access to complex tools, but make it easy for them to use those tools. This means IS departments must provide user-friendly access to databases, networks and backbone applications.

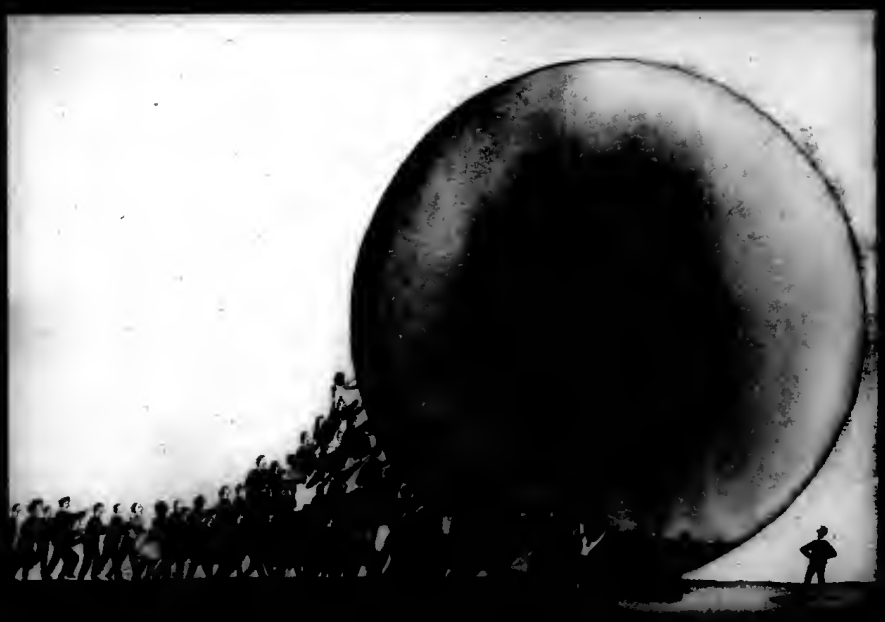
Thus, interoperability implies a strengthening of partnerships between IS departments and end users, between vendors and customers, and between manufacturers and independent resellers.

The innovative environment engendered by interoperability feeds on itself at both the user and vendor levels. As users interoperate locally and globally, they increase their expertise by sharing their experiences. Vendors benefit by borrowing and trading technologies developed by their customers.

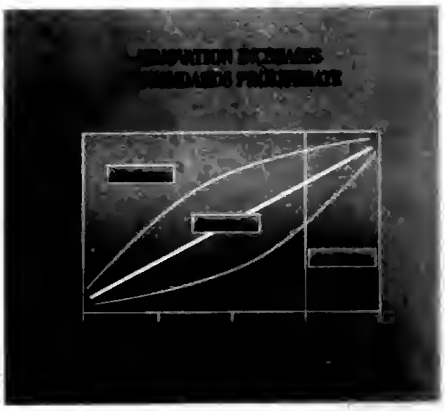
THE ROLE OF UNIX

The operating system technology that has best exploited the phenomenal price/performance improvements in microprocessors while remaining inexpensive and easily accessible is, of course, Unix. Thus, as customers large and small have shopped for IT solutions with the best price/performance tools to support the building of relatively well understood and stable types of shared-resource work systems, they have turned to the potent combination of microprocessor-based systems and Unix.

The simplified and standard technology interfaces associated with Unix not only lower technology-transfer barriers, but also greatly improve partnering possibilities.



Unix technology developed by one source is easier to license or purchase because the cost of integrating the various technologies is lower. On the hardware side, this opens the door, for example, to deals between chip manufacturers and hardware vendors or disk drive and controller makers. Additionally, vendors in the Unix realm are developing more experience with these types of arrangements than most vendors focused on proprietary product sets. These companies will find it easier to develop and administer increasingly complex combinations of technology and marketing partnerships.



As the growth of hardware technologies such as desktop computers levels off, innovative software applications begin to proliferate.

Perhaps no type of partnerships are more important in the computer industry than the partnerships forged between hardware vendors and independent software vendors (ISVs). Unix offers software vendors the opportunity to leverage development investments across numerous Unix environments because of lower technology-transfer costs. As a result, ISVs can afford to enter into more partnerships than they could in the proprietary world. Similarly, Unix systems vendors will find it easier to recruit ISVs because of the lower software-porting costs of Unix.

The final supply force driving Unix growth is the availability of relatively inexpensive, yet high-quality, Unix expertise. Because Unix is the language of learning in so many computer education programs, the best and most up-to-date computer industry labor pool contains many former Unix students. Unix minimizes the amount of proprietary technical training required to make these potential new employees productive, and, because of their relative youth, minimizes the salaries necessary for them.

On the demand side, the lower development costs incurred by Unix vendors are channeled to users in the form of lower prices. Although this sounds good, in the case of certain markets, it is important to note that these inexpensive but relatively young solutions may embody more risk than more stable, proprietary offerings.

Just as the benefits of lowered technology-transfer barriers accrue to vendors in the Unix market, users also realize significant benefits from standardized Unix technologies. The costs of moving from one Unix vendor to another are significantly less than those incurred while moving among proprietary vendors.

This is especially important in a market characterized by an ever-expanding portfolio of application packages. Just as Unix makes it easier for ISVs to develop and market new applications, it also greatly simplifies user access to these new applications.

The lower technology-transfer barriers associated with Unix make it easier for users to adopt various related technologies. The expense and risk of integrating new Unix technologies into installed Unix systems is lower than that for most proprietary systems. And once Unix systems are installed and stable, they can be expanded with minimal disruption.

New classes of Unix-based solutions that offer expanded function at no more risk than proprietary systems are emerging. The frantic pace of innovation and the relative ease of transferring innovation among Unix platforms is rapidly closing the "function gap" between Unix solutions and all but the most fine-tuned proprietary solutions.

Even in the most monolithic and proprietary environments, such as IBM's MVS/ESA, suppliers are laboring to incorporate Unix interoperability. In the past few years, IBM has delivered support for Unix-oriented technologies such as TCP/IP, X-Windows and NFS within MVS.

Still, in many proprietary environments Unix interoperability remains expensive. Users who simultaneously want to experiment with interoperability while using stable, proven technologies to perform critical work should strongly consider turning to Unix. Because many interoperability tools such as TCP/IP and NFS are both inexpensive and highly functional on Unix platforms, they are a reasonably safe investment.

It should also be noted that users, like vendors, benefit from access to the pool of former students.

THE FUTURE OF INTEROPERABILITY

Understanding the future of interoperability requires attention to two issues. The first is the rate of innovation in tools that support interoperability. The second is the way staff and expertise must be deployed in interoperable environments.

Not all the tools required for simple, heterogeneous and highly-functional interoperability are available today, let alone widely installed. Innovation must deliver new tools and enhance existing tools to keep from losing large segments of the installed base.

Three classes of tools are most important to the evolution of interoperability: networks, computer-aided software engineering (CASE) and systems management.

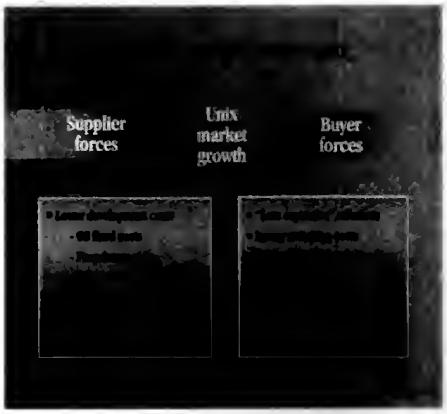
The networking entity gaining most popularity in interoperability environments is the client/server model. The client/server model borrows heavily from widely installed software technologies such as transaction monitors and LAN operating systems. In the client/server environment, the rush is to integrate the best of these relatively stable technologies and generalize the result in the form of standards.

Widespread adoption of CASE technologies is required to facilitate the transfer of application technology and provide a credible foundation for interoperable applications. CASE enables the sharing,

coordinating and documenting of application resources. With CASE, users and suppliers can at once increase program complexity, shorten development times and make vast strides in software quality.

The issue of software quality is especially important. As hardware platforms are connected into interoperable systems, shared software resources become critical to system availability.

Greatly improved systems management programs will mask increased application complexity from users and place far better tools for controlling complex information systems into the hands of information systems management.



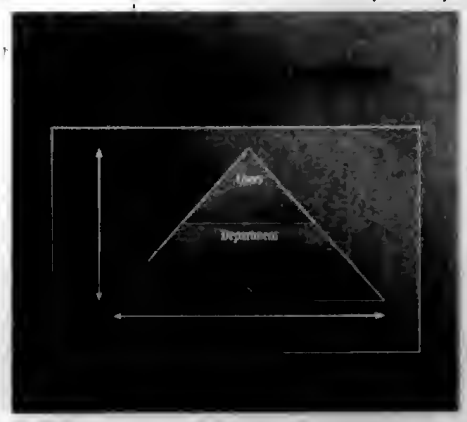
The convergence of supplier and buyer forces is driving Unix market growth.

Enhanced networking, CASE and systems management are all required to lighten demands on personnel. People can not be expected to keep up with highly dynamic interoperating information systems. For instance, it is impossible to imagine a management team keeping constant vigil over network changes that last milliseconds. Only computers can operate at such speeds, and only computers will be able to manage themselves.

The second issue relating to the future of interoperability is organizational management. Even though new systems management technologies will simplify the demands interoperability places on staff and support resources, the way staff and expertise generally are deployed must be adjusted.

Not surprisingly, the primary pressure points are the points of system interconnection. Consoles must be consolidated, data elements must be mapped to each other and application logic must be made consistent. These organizational issues affect much more than just the network management group. Operations, application development and storage management staffs will have to learn new tools and procedures. The good news, however, is that all these new skills are transferable.

The rate of interoperability adoption will be greatly impacted by what IDC calls the network externalities of interoperable computing. Interoperability is a phenomenon that will feed on itself. The initial investment in interoperable infrastructures will be expensive. However, after these initial investments are made, the average costs of interoperable applications will drop precipitously. This is because users will be able to continually leverage early software investments.



As specialization migrates from IS to departments to users, less control creates more freedom to innovate.

The economies of interoperability are thus similar to those of other network-oriented technologies such as telephony. The 400,000th subscriber to the telephone network may have to pay the same entry costs as the 400th subscriber, but he or she is able to call 399,999 other subscribers instead of only 399. It is this network externality that will be critical to the rate of growth in the interoperability market.

CONCLUSION

In the computer industry, specialization and diversity are constrained by limits on the quality and costs of our tools, and our inability to use them to build coherent and consistently-behaving information systems.

There is no such thing as a computer technology that is appropriate for all problems. The complexity of the computer community requires specialization and diversity. Today, users can shop knowledgeably for the best alternatives. They are engaged in the innovation process that spawns new tools.

Strategies for ensuring that these tools interoperate with each other, and with those already in use, are required. New perspectives about procurement priorities, resource allocation and sources of value are also needed. In addition, new patterns of management must be developed and incorporated in future automated management tools.

Beware the comprehensive open systems plan. The open systems market is very immature and unproven. Someday open systems will become a pillar of the computer industry. Rather than wait passively for that day, it makes good sense to reach for interoperability.

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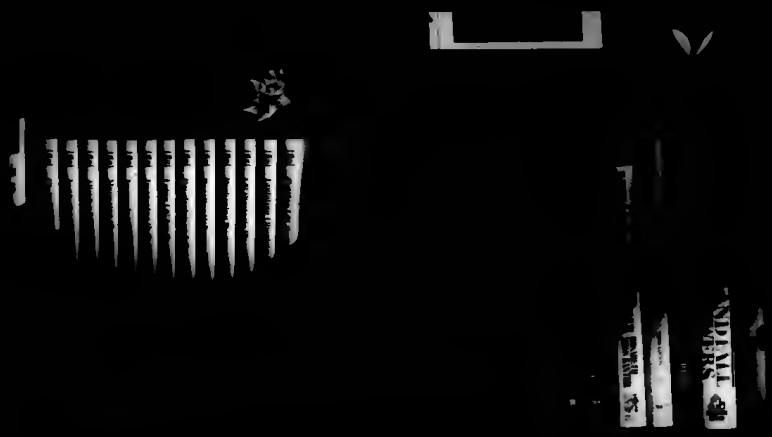

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Hi tech helps speed location of missing children

Computer technology provides agency with updated photos of kids missing for two years or more

ON SITE

BY PATRICIA KEEFE
CW STAFF

TOWSON, Va. — The greatest nightmare of any parent is to lose a child. Even when the seemingly worst happens, however, there is still hope.

For the last seven years, The National Center for Missing and Exploited Children (NCMEC) has lent a hand to families and law enforcement agencies seeking assistance in locating their missing children. More recently, it has partnered with various computer technologies to win what can be a race against time to locate the missing child safe and sound.

"The issue for us isn't the acquisition of information, it's the elimination of [irrelevant] leads," said Officer Ruben Rodriguez Jr., a former police officer and a senior analyst/supervisor at the center.

The private, nonprofit organization was established here by congressional mandate in 1984 and works with the U.S. Department of Justice in coordinating the efforts of law enforcement agencies, social service agencies, elected officials, judges, prosecutors, educators and other groups working to protect children.

The NCMEC has handled an estimated half-million calls on its hot lines. This is just the tip of the iceberg, since not all cases are reported to the organization.

Computer technologies enable the NCMEC *to provide updated photos of missing children, such as Julian Andrew Galbraith, above, through computerized aging programs. Galbraith is shown, left, at the time he disappeared. The photo on the right depicts the way he may look today. Anyone having information should contact the NCMEC at (800) 843-5678.*

The technology used at the center fulfills two vital roles: It helps speed collation and analysis of leads, which otherwise would be extremely time-consuming. It also enables the agency to provide, through computerized aging programs, updated photos of children missing for more than two years.

Rodriguez works primarily with Mapinfo's desktop mapping software. The data visualization and analysis tool is used to chart leads and track sightings of missing children and their abductors. Mapinfo can layer data geographically and answer complex what-if questions with its relational database. A compact disc/read-only memory version of the package valued at $30,000 was recently donated to the center.

Mapinfo allows Rodriguez to plot sightings on a map and embed profiles of suspects and the missing child into the map along with a complete record of related calls. "Instead of having to read 400 leads, I can now eliminate large numbers just by viewing areas of reporting," he said. (No lead is ever really eliminated — all are passed on to law enforcement agencies.)

The ability to set filters on the map allows him to trap calls relating to specific areas or describing specific attributes. "It gives me something I can make sense out of," Rodriguez said.

Pinpointing patterns

The profiles are useful in that they ferret out red herrings. By zooming down through layers of maps, right to street or neighborhood listings, he sometimes can pinpoint patterns as well. "Individual tips may mean nothing, but if you can relate them to the same interstate area, for example, you may have something to go on."

Another key use of technology involves an age progression system, based on hardware from IBM and Sony Corp. and software from QMA Group. That program is run by in-house expert Horace Heafner, who formerly headed the Federal Bureau of Investigation's forensic art unit.

A review panel selects which children are input in the age progression system. "The child has to have been in the system for at least two years, because that is when you start seeing changes," Rodriguez explained.

Age progressions are distributed in a number of ways, including through a national flyer campaign. "The Advo Child of the Week" flyer hits 55 million U.S. households per week, generating as many as 4,000 to 5,000 leads per child.

The center also has a dial-up link into the FBI's National Crime Index Computer database system. "We are able to go into the wanted person, missing person and 'unidentified' files and do queries. It's a look-and-retrieve access," Rodriguez said.

On a day-to-day basis, the operation is run on an in-house Novell, Inc. Netware 286 Version 2.15-based network. It links about 45 case workers, hot-line operators and other personnel using a hodgepodge of PCs.

All data collected goes into a central database and stays there until the missing child is found. The center currently uses Ashton-Tate's Dbase III+.

A grant from the Justice Department has given the green light to internal efforts to create an electronic bulletin board that will be used to outfit an existing 43-state clearinghouse.

Missing kids

In its seven years of existence, NCMEC has provided technical assistance in more than 27,000 missing and exploited child cases, with over 17,700 recoveries. More than 9,000 children remain missing.

The center breaks down its activities in the following way:

- Runaways: Out of 14,344 cases, 12,854 located alive and 41 located deceased.
- Family abductions[1]: Out of 10,370 cases, 4,359 located alive and 8 located deceased.
- Nonfamily abductions[2]: Out of 1,170 cases, 280 located alive and 145 located deceased.
- Lost, injured, missing: Out of 1,466 cases, 497 located alive and 45 located deceased.

[illegible]

PATRICIA KEEFE

Lexmark keyboards can perform mouse functions

BY KIM S. NASH
CW STAFF

LEXINGTON, Ky. — IBM Personal System/2 users have a new way to move data around the screen. Instead of an external mouse or trackball, users can control the cursor via a pointing device embedded in the keyboard.

Lexmark International, Inc., based here, plans to roll out the device at Comdex/Fall '91 this week in two of its five IBM-compatible keyboards. Users can perform mouse functions such as pointing and clicking with the new feature, which is available in four versions: a small or large trackball placed in two different spots, a touch key or a rubber-domed trackball.

The biggest benefit of the keyboard-resident device is that users can get mouse functionality without the added bulk of a traditional mouse or a flip-out accessory, the company said. A more compact, easier to use mouse is "critical" as more people use graphical user interfaces and portable computers, said Raymond Reichenbach, who is responsible for Lexmark's keyboard and input technologies operations. The embedded pointer also produces more efficient keystrokes, he said.

Lexmark's G2 Quiet Touch and G Enhanced 101 keyboards come equipped with the new device.

The company, which was spun off from IBM in March, will sell the embedded pointer to other OEMs for sale under their own names.

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COMMENTARY

Jesse Berst

The true cost of a GUI

Trying to figure out the cost of moving to Windows or Presentation Manager? Let me warn you of a few things you're likely to overlook and tell you where to find some help.

First the good news. Hardware and software costs may be lower than you expected. Hardware costs have plunged dramatically in the past year.

As for software, you don't have to replace your existing programs right away. Both Windows and OS/2 Version 2.0 will run existing DOS programs.

When you get around to switching to Windows applications, you'll be amazed at the bargains. Thanks to an ongoing price war, you will probably pay less than 25% of the list price for mainstream productivity programs.

What about the costs of installing Windows?

I have good news for you here, too. More than 130 companies ship Windows with their computers, often preinstalled. IBM is expected to bundle OS/2 Version 2.0 with its Personal System/2 computers and is said to be encouraging other hardware vendors to do the same.

Many of you, of course, will have to install the new environment on the machines you already own. Corporate users typically get Windows and a few basic applications installed in one to two hours per machine.

If you have many different computers, or if you're hooked up to a network, the installation time can climb to four hours or more.

When it comes to training and support, however, you're probably going to spend more than you expected.

Vendor claims to the contrary, users need training to get up to speed on a graphical user interface (GUI). Yes, they need less training over the long run, but in the beginning, you should allocate at least half a day for the GUI. And don't forget to account for training the support staff.

The size of the support expense depends largely on the way you make the transition.

"Support costs aren't a huge burden if you bring in a GUI gradually, especially if you give it to your most sophisticated, patient people first," said Windows convert Andrei Chivvis, first vice president of Financial Guaranty Insurance. "However, if you are forced to migrate all at once, it will [require] an enormous support effort."

If you want help with your cost-benefit analysis, try the Windows Migration Planning Manual from software reseller Corporate Software. Packed with advice, checklists and costing models, it's the best migration aid I've seen, even though it's a pricey $595 for corporate accounts ($795 list).

If you don't want the advice but you do want a planning model, try Microsoft's Windows Resource Kit ($20 plus shipping). This loose-leaf binder of tips and tricks has just been updated to include a cost-benefit analysis based on Corporate Software's study of 14 real-world companies. There's a fill-in-the-blanks paper version plus an on-disk spreadsheet model.

WHEN YOU GET around to switching to Windows applications, you'll be amazed at the bargains. Thanks to an ongoing price war, you will probably pay less than 25% of the list price for mainstream productivity programs.

I'm as cynical as the next person, so I realize that Microsoft and Corporate Software have ulterior motives for offering planning aids. Still, I think both products are valid because they let you fill in the blanks with your own data. You can even modify the formulas if you are skeptical about the benefits they propose.

What's more, I think these aids actually understate the benefits of moving to a GUI. Both of them use reduced training and support costs as the source of most of the payback.

In my opinion, many of the most compelling benefits are intangible.

"I hate to use this phrase, but it's true: Windows is an 'enabling technology,' " Chivvis said. "It lets you do things you weren't able to before — put information into more useful formats, merge pictures and text, put several applications under one umbrella, reduce development costs and so on."

So, as you wrestle with costs and benefits, perhaps the most important question is: What will it cost *not* to migrate?

Berst is the publisher of Redmond, Wash.-based "Windows Watcher" newsletter, a monthly briefing service for software executives and corporate technology managers.

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I have decided to continue maintenance on my GEM-based IEW. I really don't need multi-user support, since my team can kind of integrate data through your expensive mainframe component. Or buy an add-on product and batch the task over a weekend. We're still trying to justify the budget to upgrade our hardware and move to ADW, hoping your code generator can someday produce code we can use. I am happy to buy additional software which fixes documentation and prototyping deficiencies. As for this maintenance fee, what the heck! I can't "take with me," can I?

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Pen computer

FROM PAGE 39

cost less than $2,000. Scheduled to ship in the first quarter of 1992, it will be based on Motorola, Inc.'s MC68331 processor and a proprietary operating system. The battery life is estimated at 15 hours. The initial emphasis of Infolio is on vertical markets in medicine, accounting, finance, insurance and transportation.

• Grid Systems Corp. will put a new version of its Gridpad pen-based computer through the paces. The 5-pound GridpadSL, unveiled last week, uses Intel's speedy 20-MHz 80386SL chip, which was specifically designed for portable computers. Pricing is expected to range from $5,000 to $7,000 when the machine becomes available in the second quarter of 1992.

• Samsung Information Systems America, Inc.'s Penmaster will also be based on the 386SL chip and will offer a backlit IBM Video Graphics Array screen. It can support up to 20M bytes of RAM and has a 120M-byte hard disk; it will weigh less than 5 pounds and sell for under $5,000, Samsung officials said.

• IBM is expected to show two machines offering pen-input capabilities. The first will use a 20-MHz 80386SL microprocessor and run the Penpoint operating system from Go Corp. Sources said it is expected to offer a reflective screen with a backlit option forthcoming, weigh approximately 5 pounds and be available next year. Batteries should provide four to eight hours of operation, depending on configuration. IBM may also show a tablet PC that runs OS/2 and recognizes pen input, sources said.

• Momenta Corp. will exhibit its namesake machine ($4,995), which has the dimensions of a three-ring notebook and uses the 80386 chip. The Momenta includes a spreadsheet from Penware, Inc. in San Jose, Calif., as well as a word processor, a presentation graphics program, a built-in fax and a data modem.

• DFM Systems, Inc. in Des Moines, Iowa, will show its Travelite, a hybrid between a pen-based PC and a traditional notebook model. The Travelite uses a touch-sensitive screen for limited functions, but a pen-based model is planned. The 5½-pound model is powered by an 80286 chip and costs $3,250.

• Hyundai Computer Corp. is also expected to show a pen-based prototype that is based on the 20-MHz 80386SL and runs Go's Penpoint.

Analysts said these products are only the first splash of a product wave that will break over the industry next year. Market research firm Computer Intelligence/Infocorp estimated that annual sales of pen-based computers will hit 3.4 million units by 1995, up from approximately 51,000 units this year.

Today, however, sales of pen-based systems are slow. Grid, one of only a handful of firms now shipping pen systems, only sold 10,000 machines in 1990, Grid President Alan Lefkof said. That figure is expected to rise to 30,000 this year, he added.

Improvements in handwriting recognition, display technology, durability and pricing are expected to spur business and drive pen-based computers from vertical markets into broader horizontal business. The electronic stylus is also expected to serve as the foundation of systems ranging from travel reference companions that pop up on-screen electronic maps to portable offices equipped with faxes and modems.

"Pen-based systems do not necessarily mean handwriting recognition," said Bill Lempesis, editor and publisher of "Pen-vision News."

> IMPROVEMENTS IN handwriting recognition, display technology, durability and pricing are expected to spur business and drive pen-based computers from vertical markets into broader horizontal business.

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Solution Systems upgrade a pleaser for developers

BY CHRISTOPHER LINDQUIST
CW STAFF

Solution Systems plans to announce at Comdex/Fall '91 this week an updated version of its Sourcerer's Apprentice source-code version control software package, including an available Microsoft Corp. Windows interface.

Sourcerer's Apprentice Version 2.0 runs under Windows and helps developers track and organize source code being used in software development projects. The product lets developers check source code in and out, locking the files as they do so. Code revisions can be documented and tracked. Files can be compared, and sets of code files can be grouped and selected as a group to ease file handling.

New features in Version 2.0 include the following: data compression and archiving, additional reporting functions and security features that allow administrators to set the security level of users, either preventing or allowing them access to files or directories. Archiving support for Novell, Inc. servers is also included in the package.

The Windows interface for Version 2.0 allows users to simply point and click on files or groups of files to check them in or out. Visual icons indicate when files are locked or archived.

Greg Weinstein, a member of the technical staff at Audio Animation, Inc., a computerized audio processing equipment vendor in Knoxville, Tenn., is very pleased with the Windows version of the product.

Solution Systems "was very responsive to the real-world-type problems that I and others were trying to solve with the previous version," Weinstein said. "I really believe that when people see this, they are going to get very excited."

Version 2.0 of Sourcerer's Apprentice will include both DOS- and Windows-interface versions. Retail price for the product, which is expected to ship in December, will be $599. Site license discounts will also be available.

This is the one after that.

And because the disk controllers, I/O interface, and VGA ports are built into the mainboard, there are 7 expansion slots available.

Of the 4 drive bays, 3 are accessible from the front of the computer. And the system has 2 serial ports and one parallel port. All in a compact slimline case.

In other words, The Tandon Option is a system that offers you all the technology of today, and the option of all the technology of tomorrow.

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FAX 805-529-8408

OPTION
Tandon

Server

FROM PAGE 39

up system from Maynard Electronics, Inc.

"What you see here is, for the first time, AST starting to offer more of an entire server solution than we have until now," said Larry Fortmuller, director of high-performance systems.

"It's definitely a necessary step for AST," said Forrester's Bluestein. "All the contending clone guys are trying to develop something that says they're more than just clone makers."

Bluestein said users are looking to follow a migration path up from 486-based servers, rather than deploying minicomputers, and that AST was positioned well to take advantage of this.

An indirect benefit

Some observers think AST's entry into the high-end file server market will benefit users indirectly as well.

"By getting a second source into the market, it keeps pricing pressure on Compaq," said Bruce Lupatkin, an analyst at Hambrecht & Quist, Inc., an investment banking firm in San Francisco.

Lupatkin said that while AST is not the first to develop Systempro-type products — Advanced Logic Research, Inc., Wyse Technology, Inc. and Everex Systems, Inc., among others, have high-level servers — AST's market impact is more significant.

"I think in the server market, brand name is more important than in the desktop market," Lupatkin said. "If you're a corporate customer and you're going to run a real business application on it, you're going to be a little leery to run it on a second- or third-tier vendor's product."

1-2-3 for Windows: Compatible GUI, but slow

Lotus' 1-2-3 for Windows

Reviews	Performance	Compatibility	Output	Analysis tools	Documentation	Ease of use	Support	Value	Overall
Infoworld 9/9/91	Satisfactory speed	Very good	Satisfactory	Good	Satisfactory	Poor	Very good policies	Satisfactory	*5.6
PC Magazine 10/29/91	Bugs abound	Most DOS macros run flawlessly	Bundled with ATM	Little innovation	NC	Smart icons are fine idea	NC	Not many reasons to move	Timid entry into Windows market
PC Week 8/26/91	Relatively sluggish	DOS worked flawlessly	NC	Lacks out-listing ability	On-line help poorly organized	Point and shoot simplicity	NC	NC	Rusp, slightly [illegible]
Users									
Benjamin Goldfarb, Shaklee Sunland Co.	Good	Very good	Very good	Very good	Good	Good	Very good	Good	Maintained tru-dional commands
Tom Ferguson, City of Phoenix	Good	Very good	Very good	Good	Good	Very good	Good	Good	Applaud them for compatibility
David Beckman, Beckman and Hirsch	Good	Very good	Very good	Very good	Good	Very good	Very good	Very good	A major step forward
Analysts									
Mel Mok, Findhow Information Services	Good	Very good	Good	Good	Good	Good	Good	Good	Does not compare to Excel
Amy Wohl, Wohl Associates	Good	Very good	Very good	Good	Very good	Very good	Good	Very good	Pleased about consistent interface
Cheryl Currid, Currid & Co.	Good	Good	Good	Very good	Good	Good	Good	Good	Good if already a Lotus user

Key: Very good Good Fair Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone surveys. NC: No comment. **Infoworld* ratings based on 1 to 10 scale.

Technology Analysis — A roundup of expert opinions about new products. Summary written by Computerworld *intern Lisa Davidson.*

Spurred by competition from Microsoft Corp.'s Excel 3.0, Lotus Development Corp. has devised 1-2-3 for Windows to take advantage of the graphical user interface while adding new capabilities including Dynamic Data Exchange (DDE) and dialog boxes. Despite these features, reviewers said, the new version shows little innovation and has some kinks to work out.

Performance: Sluggish performance is one of the kinks reviewers referred to. 1-2-3 for Windows is slow, in part because of the graphical environment but also because of the product's slow calculation engine — the same one found in Version 3.1 for DOS. The Windows version requires a minimum of 2M bytes of memory. New in 1-2-3 for Windows are Smarticons, over 70 customizable icons that automate common commands and analysis functions.

Vendor financial ratings

Analysts	Long-term stability	Short-term performance	Outlook
Wendy Abramowitz, Aspen Research Corp.	Good	Good	Fair
Alfred Tobia, Mabon Securities Corp.	Good	Very good	Financially secure

Lotus earned $9.1 million in profit on $186.4 million in revenue for the quarter ending in June. This compares with $23.5 million in profit and $177.5 million in revenue for the same period last year.

Compatibility: Compatible with DOS-based Release 3.1 and Lotus Symphony, 1-2-3 for Windows reads Excel files as well as style formats from Impress and Symphony. Live link support with other Windows applications is possible through DDE.

Output: The 1-2-3 for Windows package includes 13 scalable Adobe Systems, Inc. Postscript typefaces and Adobe Type Manager, yielding precise output regardless of font size and printer or display type.

Analysis tools: 1-2-3 for Windows retains the Solver/Backsolver goal-seeking tool offered in Version 1-2-3/G and Release 3.1. The Solver and Backsolver allow users to find the optimal way to produce a desired value in a specified cell.

Data can be dissected with up to 256 work sheets. Each work sheet can contain 536 million cells. Lotus' three-page dimensional work sheet format handles larger data models.

Documentation: The package includes manuals for both new and upgrade users, a Smarticons reference card and material covering Datalens drivers and Solver. On-line hypertext help is also offered.

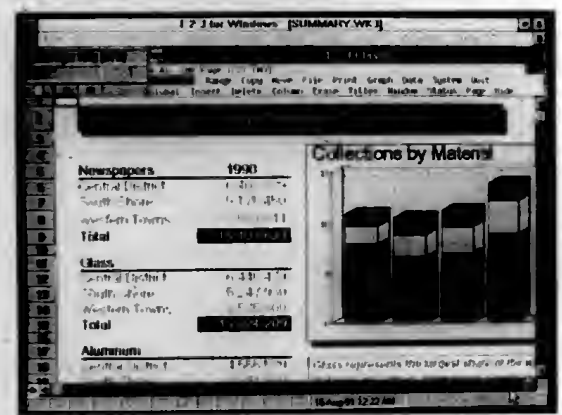
Ease of use: Keystroke and macro compatibility with early 1-2-3 versions make 1-2-3 for Windows easy. Other helpful functions are vanishing dialog boxes and Datalens drivers.

Reviewers reported some annoying glitches that can interfere with ease of use, however. *Infoworld* noted, for example, that dialog boxes occasionally refuse to disappear.

Support: Live toll-free telephone support is available 24 hours a day, seven days a week, for the first six months after purchase. After that, support is provided through non-toll-free telephone lines.

Value: 1-2-3 for Windows retails at the same price as Release 3.1 — $595. Licensed 1-2-3, Excel and Borland International, Inc. Quattro Pro users can switch for $150.

Network Server ($895) and node editions ($595) will be available soon, according to Lotus. Overall, reviewers said, 1-2-3 for Windows offers features that will attract experienced 1-2-3 users. But users looking for innovation may be disappointed, and a few bugs lurk in the current version.



Lotus' 1-2-3 for Windows *has added features and takes advantage of GUI, but reviewers are not impressed by its kinks and sluggish performance*

Lotus responds

Jeffrey Beir, director of product marketing:

Performance: Our internal tests show that our recalc is comparable or better than Excel. Despite criticism, customer feedback has been positive with regards to performance. However, we are still focusing our development resources on improving screen repaint performance and initial load.

Ease of use: 1-2-3 for Windows delivers many ease-of-use innovations while at the same time being consistent with Windows user interface guidelines. Innovations such as Smarticons and 1-2-3 Classic deliver all the ease-of-use mechanisms that a user expects in a windows application. 1-2-3 Classic makes the transition from DOS painless by providing complete keystroke macro and file compatibility. We suspect that early criticism on ease of use is related to the bugs, which have been fixed in the slipstream release.

[Lotus released an upgrade to address problems with the product for current customers. A regulary scheduled upgrade — Version 1.1 — is due out early next year.]

NEXT WEEK

▶ Reviewers eye spreadsheets for Apple Computer, Inc.'s Macintosh, including Claris Corp.'s Resolve and Microsoft Corp.'s Excel 3.0.

UNTIL NOW,
ACCESSING ALL YOUR
CORPORATE DATA
WOULD TAKE A MIRACLE.

Analyst upgrade arrives

BY CHRISTOPHER LINDQUIST
CW STAFF

Xerox Corp. last week announced the latest version of Analyst, its data analysis software package for use under the Objectworks/Smalltalk programming environment.

Analyst Version 3.5 was designed to allow users to analyze and organize large amounts of disparate data by establishing links between related databases, documents, images and other sources of information using object-oriented applications and hypertext.

Users can examine data using a point-and-click interface. There is no need for programming.

Analyst comes with such applications as document layout, report generation, forms, business graphics, network communications, spreadsheets and personal databases. All applications use a common graphical interface, which reportedly allows users to easily move between them.

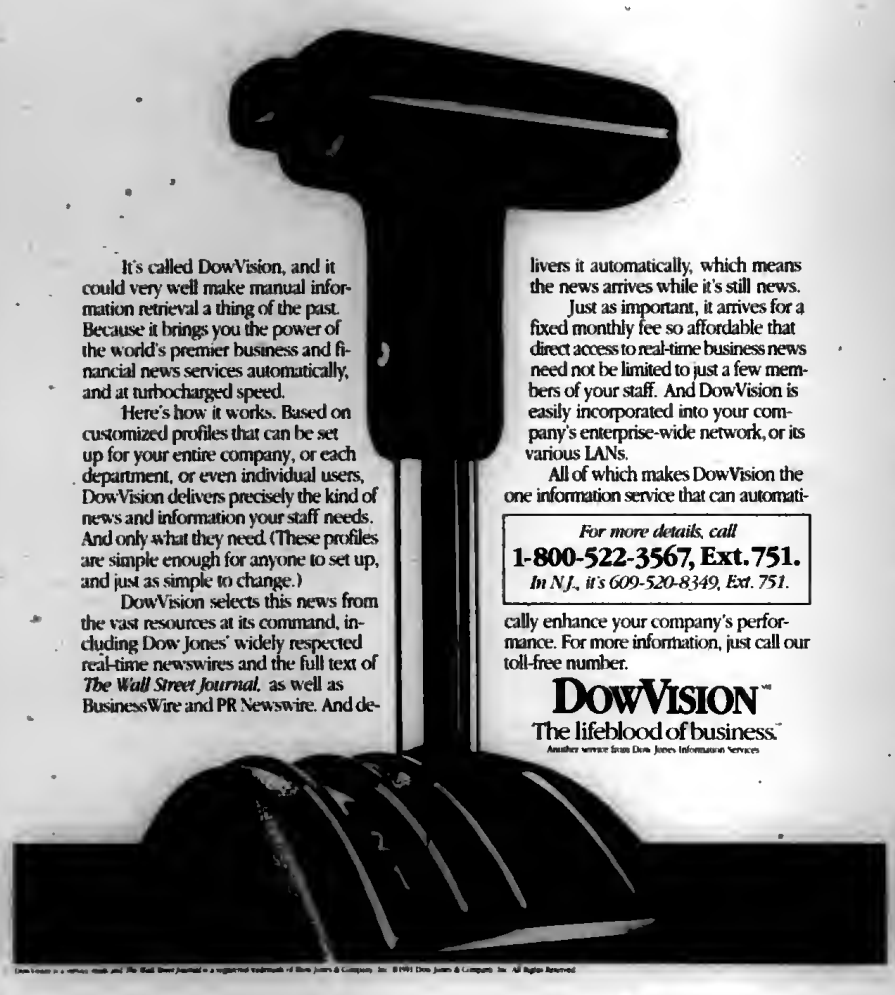
Customized for user needs

The product is also available with its Objectworks/Smalltalk source code, allowing developers to customize the product to meet user needs. Objectworks/Smalltalk is an object-oriented programming language that was developed by Xerox but is now marketed by Parcplace Systems, Inc. in Mountain View, Calif.

Analyst 3.5 is available for MS-DOS, Microsoft Corp. Windows 3.0, Apple Computer, Inc. Macintosh and Unix environments. Unix systems supported include those from Xerox, Sun Microsystems, Inc., IBM, Digital Equipment Corp. and Hewlett-Packard Co.

Retail pricing for the product is $1,745 for Windows, Macintosh and DOS systems and $2,995 for Unix workstations. Prices for developer versions with source code are $3,400 for Windows, Macintosh and MS-DOS systems and $3,400 for Unix systems.

Now there's a true high-performance information service with automatic transmission.



It's called DowVision, and it could very well make manual information retrieval a thing of the past. Because it brings you the power of the world's premier business and financial news services automatically, and at turbocharged speed.

Here's how it works. Based on customized profiles that can be set up for your entire company, or each department, or even individual users, DowVision delivers precisely the kind of news and information your staff needs. And only what they need. (These profiles are simple enough for anyone to set up, and just as simple to change.)

DowVision selects this news from the vast resources at its command, including Dow Jones' widely respected real-time newswires and the full text of *The Wall Street Journal*, as well as BusinessWire and PR Newswire. And delivers it automatically, which means the news arrives while it's still news.

Just as important, it arrives for a fixed monthly fee so affordable that direct access to real-time business news need not be limited to just a few members of your staff. And DowVision is easily incorporated into your company's enterprise-wide network, or its various LANs.

All of which makes DowVision the one information service that can automatically enhance your company's performance. For more information, just call our toll-free number.

For more details, call
1-800-522-3567, Ext. 751.
In N.J., it's 609-520-8349, Ext. 751.

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Court to rule on sales tax

BY KIM S. NASH
CW STAFF

New sales taxes probably will not stop many people from buying personal computers through the mail, but they could mean lower profits for PC makers already fighting a price war, users and analysts said.

At issue is whether an out-of-state mail-order company can do enough business in a state to qualify as having a "presence" in that state. If so, that mail-order company may be responsible for collecting state and/or local sales taxes from its customers.

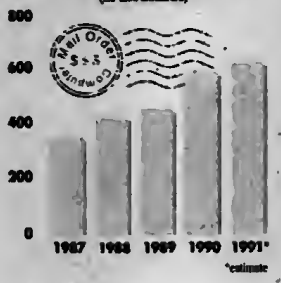
The U.S. Supreme Court agreed recently to hear between now and July 1992 a case that, if overturned, could void a 1967 high court ruling that effectively made mail-order goods tax-free.

However, users interviewed said tax or no tax, they would keep buying from mail-order clone makers.

Postal boxes

Mail-order PC sales are growing, although they are still a small fraction of total shipments

U.S. mail-order unit shipments (in thousands)



Source: International Data Corp. CW Chart: Janell Genovese

"You're talking minimal price increases, so we'll still save money" over dealer and manufacturer prices, said Walker Eng, manager of computer operations at West Haven, Conn.-based Lender's Bagel Bakery, which recently bought 50 PCs from Northgate Computer Systems, Inc.

Sales tax on by-mail PC products is not new, said Charlie Lenore, a Hartford, Conn., tax attorney at Day, Berry and Howard. Some firms already charge state sales tax of their own volition.

However, a Supreme Court ruling forcing vendors to charge tax might ultimately eat into vendor profits. Companies may cut prices to compensate for the added end-user cost of a tax to keep potential customers from shunning direct-mail products. "Those guys compete on price. Raise it, and things won't look so good," said Chuck Barney, an analyst at International Data Corp.

Revenue in the direct-mail channel has already begun to shrink as vendors battle to undercut one another's prices. This year's U.S. PC hardware sales will be $5.2 million, down more than 10% from 1990's $5.8 million, according to IDC.

Senior writer Michael Fitzgerald contributed to this report.

INFORMATION BUILDERS INTRODUCES ENTERPRISE DATA ACCESS/SQL

Relational and Non-relational Data.

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NEW PRODUCTS

Development tools

Anthora 1.0, a multiuser relational database development tool, has been created by Exxitus Corp.

Anthora runs under Microsoft Corp.'s Windows 3.0 environment and includes two embedded report generators, a dialog editor and a language similar in structure to C language. It also offers the ability to display and update indexed and related databases simultaneously and to include graphical information in database fields.

The product costs $295. A compiler is available for $89.

Exxitus
7206 N.W. 31 St.
Miami, Fla. 33122
(305) 477-0804

Software Quality Automation, Inc. has begun shipping SQA:Robot.

SQA:Robot is a capture/playback/comparison tool for developing applications under Microsoft Corp.'s Windows 3.0. It checks graphical applications for consistency and quality through test scripts.

The product records all functions of the Windows environment, the company reported, including mouse actions, dynamic data exchange interactions and windowing changes. Test scripts can be altered through Microsoft's Visual Basic tools.

The product costs $695.

Software Quality Automation
1 Parker St.
Lawrence, Mass. 01843
(508) 689-0182

Data storage

Tapeware/DT comes with 2G bytes and 4G bytes of backup storage capacity

Emeritus Technologies has introduced a series of 4mm digital audio tape subsystems for personal computer users.

Tapeware/DT systems are available with 2G bytes and 4G bytes of backup storage capacity. Both models include archive management software.

Pricing for the internal 2G-byte version is $2,495. The internal 4G-byte model costs $2,995.

Emeritus Technologies
2750 N. Clovis Ave.
Fresno, Calif. 93727
(209) 292-8888

Software applications packages

Greenleaf Software, Inc. has announced Version 2.0 of Greenleaf Makeform.

The product enables programmers to design screens for use with the company's Datawindows data entry software. Version 2.0 offers flexible form background colors, templates and test runs for new forms.

The Greenleaf Makeform software costs $249. Upgrading from the previous version costs $80.

Greenleaf Software
Suite 570
16479 Dallas Parkway
Dallas, Texas 75248
(214) 248-2561

Trend Micro Devices, Inc. has announced the PC Rx antiviral software product.

PC Rx uses artificial intelligence technology to recognize virus patterns, the firm reported, and protects personal computers against undiscovered viruses. It detects boot sector viruses and examines extended and conventional memory, hard and floppy disk drives and .EXE and .COM files.

PC Rx is priced at $69, which includes a year of free updates via bulletin board.

Trend Micro Devices
Suite D
2421 W. 20th St.
Torrance, Calif. 90501
(213) 782-8190

Archetype, Inc. has announced additional software to be bundled with its page makeup software package Archetype Designer 3.1.

Now included with Archetype Designer are Adobe Systems, Inc.'s Adobe Type Manager and Typealign; Edco Services, Inc.'s Letrtuck+; Metro Creative Graphics, Inc.'s Laserart CD; and Monotype Typography, Inc.'s typefaces.

Archetype has also lowered the price of Archetype Designer from $995 to $695 until the end of November.

Archetype
100 Fifth Ave.
Waltham, Mass. 02154
(617) 890-7544

Varimetrix Corp. has announced Varimetrix Drawing and Varimetrix Gateway.

Varimetrix Drawing ($1,900) is a two-dimensional modeling tool. According to the company, it records design intent and

dFacts Are In.

DATABASE COMPARISON TABLE	dBASE IV version 1.1	Paradox version 3.5	FoxPro version 1.02
[illegible]			
Control Center organizes data, queries, forms, reports, labels, applications on one screen	Yes	No	No
Create applications without programming	Yes	Yes	No
Modern pulldown menus for all Design Tools	Yes	No	Limited
Query by Example (QBE) for easy access to information	Yes	Yes	No
Context specific help by menu item	Yes	No	No
[illegible]			
Quick Layout for automatic forms, reports and labels	Yes	No	Yes
Application Generator for quick application development	Yes	Yes	No
Automatic code generation for all Design Tools	Yes	No	No
Automatic maintenance of multiple indexes for ordering data	Yes	No	No
Memo fields for notes, letters, descriptions	Yes	No	Yes
[illegible]			
Bold, underline, italic, subscript, superscript text for high impact reports and labels	Yes	No	No
User Defined Functions for extending programming language	Yes	No	Yes
Data input validity checking in forms	Yes	Yes	Yes
Multi-user transaction processing ensures data integrity	Yes	No	No
Number of file formats imported/exported	7	5	5
[illegible]			
#1 Selling, #1 Rated multiuser database; over 3 million sites (1)(2)	Yes	[illegible]	[illegible]
Compatible with dBASE III PLUS data and applications	Yes	No	Yes
Compatible versions for DOS, VAX VMS, Macintosh, SunOS and other UNIX platforms (3)	Yes	No	[illegible]
Structured Query Language (SQL) integrated with programming language	Yes	No	No

(1) dBASE III PLUS and dBASE IV [illegible] (2) [illegible] (3) [illegible]

Based on what our customers tell us, we made a list of some of the most important features to look for in data management software.

Then we compared the new dBASE IV® version 1.1 with two other database products.

As you can see, dBASE IV offers exclusive advantages in many categories.

For instance, only dBASE IV lets you access all its functions from a single screen. Called the Control Center, this screen lets you manage existing data, and create new tables, queries, reports, forms and labels totally without programming.

When all the facts are on the table, it's easy to see which database software is best.

Of course we aren't the only ones who have come to this particular conclusion.

Software Digest rates dBASE IV version 1.1 the #1 Multiuser Database (Vol. 7, No. 13, Oct. '90).

Trademark/owner dBASE IV, Ashton-Tate, Ashton-Tate logo/Ashton-Tate Corp. Other company or product names mentioned may be

model match the original intent.

Varimetrix Gateway ($800) generates solid models from two-dimensional line drawings. It allows dynamic object rotation and placement.

The company's computer-aided design tools are initially available on Sun Microsystems, Inc. workstations.

Varimetrix
Suite 4
2350 Commerce Drive
Palm Bay, Fla. 32905
(407) 676-3222

SAS Institute, Inc. has ported the SAS System to the Next Computer, Inc. workstation platform.

The SAS System is an integrated suite of information delivery software applications. The first-year single license fee on the Next platform is $825.

SAS Institute
SAS Campus Drive
Cary, N.C. 27513
(919) 677-8000

Peripherals

Prohance Technologies, Inc. has developed the Promouse, a high-performance mouse with 10 commonly used buttons.

The Promouse supports resolution up to 5,000 dot/in. and 400 reports each second, providing smoother, more precise on-screen cursor positioning, the company said. The additional buttons on the Promouse are Escape, Enter, Pageup and other keyboard functions. The firm also reported that the Promouse can be used with applications that do not have mouse support built in.

Promouse costs $69.95.

Prohance Technologies
1307 S. Mary Ave. #104
Sunnyvale, Calif. 94087
(408) 746-0950

Ciprico, Inc. has begun shipping a Micro Channel Architecture (MCA) version of its small computer systems interface (SCSI-2) adapter.

The Rimfire 5700 SCSI Adapter supports SCSI peripherals with data transfer rates of up to 10M byte/sec. It uses an onboard command queue to optimize disk and adapter performance. It also implements the firm's Softcache technology, using system memory as a cache to further improve storage access times.

The MCA version costs $895.

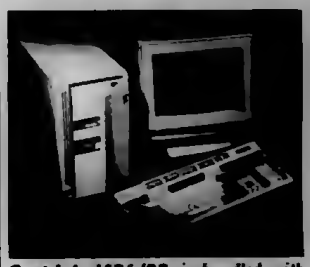
Ciprico
2955 Xenium Lane
Plymouth, Minn. 55441
(612) 559-2034

Okidata Corp. has announced the Okidata OL830 LED Page Printer, an 8 page/min. printer priced at $1,999.

The printer offers Hewlett-Packard Co. Laserjet and Adobe Systems, Inc. Postscript compatibility. It includes 2M bytes of random-access memory and 17 resident fonts.

Okidata
532 Fellowship Road
Mount Laurel, N.J. 08054
(609) 235-2600

Systems



Centrix's 1486/33 is bundled with DOS 5.0, Windows 3.0 and a mouse

Centrix Computer has announced a high-end personal computer system bundled with Microsoft Corp.'s DOS 5.0, Windows 3.0 and a mouse.

The Centrix 1486/33 includes 4M bytes of memory, a 64K-byte cache memory, two floppy drives and a 130M-byte hard drive for $3,095.

The price also includes a Super VGA color monitor and a year of on-site service, the company said.

Centrix Computer
15315 Valley Blvd.
Industry, Calif. 91746
(818) 855-2800

PC system software

Quantum Software Systems Ltd. has released QNX 4.0, said to be the first available real-time microkernel operating system.

QNX 4.0 is Posix-compliant and runs on any personal computer. It costs $795 for a single node. Additional nodes on a network cost $695.

Quantum Software Systems
175 Terrence Matthews Crescent
Kanata, Ontario K2M 1W8
(613) 591-0931

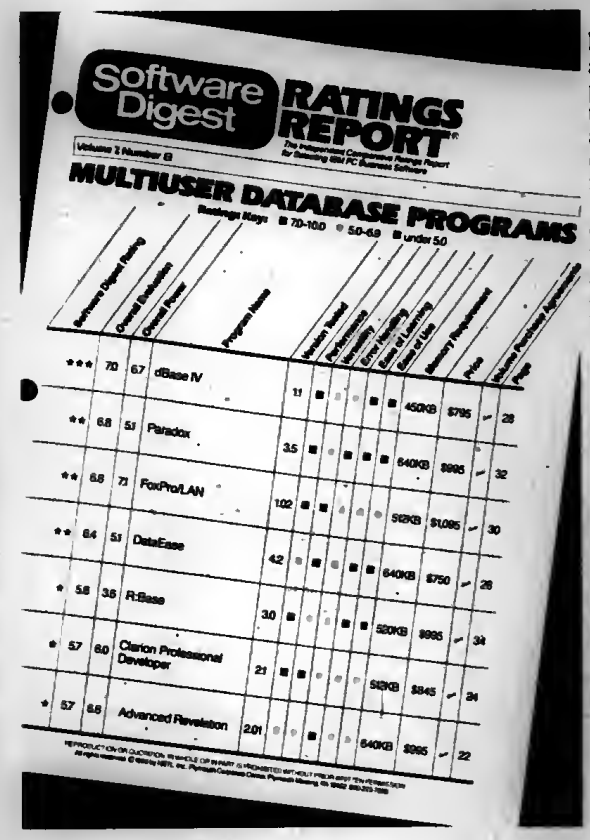
Zenith Data Systems has announced a BIOS upgrade for its Mastersport 386SL notebook computers.

The BIOS for the Mastersport 386SL is in reprogrammable flash memory. The upgrade is available from the company's Zlink COM-1 bulletin board and from Compuserve's Zenith Data Systems forum.

There is no cost except downloading charges.

Zenith Data Systems
2150 East Lake Cook Road
Buffalo Grove, Ill. 60089
(708) 808-5000

dTruth Comes Out.



Perhaps the most independent publication in the industry, *Software Digest* accepts no advertising whatsoever. Corporations pay hundreds of dollars a year to receive their monthly reviews—which are considered highly unbiased and objective. Their exhaustive, 75-page report concludes:

"Among the top ranking programs, dBASE IV (version 1.1) is the most well-rounded, with solid performance, versatility, and usability." Commenting on speed, *Software Digest* points out that "dBASE IV produces all three test reports as fast as or faster than FoxPro/LAN." As for Ease of Use and Ease of Learning, dBASE IV scored in the Excellent Range as many times as any other multiuser database product tested.

For a free evaluation kit, including competitive details and a free demo disk, call toll-free: 1-800-437-4329 ext. 1416. Better yet, call 1-800-2ASHTON to upgrade to the new dBASE IV now.

dBASE IV

The truth is, no other database can do so much to improve productivity.

Ashton-Tate

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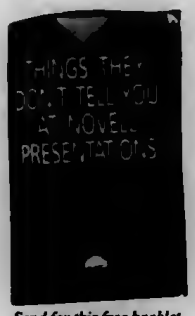
Nightmare Scenario #1

THE UNDETECTED TIME BOMB.

The biggest networking disasters always start small.

The problems tend to begin when you need to grow.

Suddenly, the computer network that worked so well doesn't seem to work at all.



Send for this free booklet full of hard, comparative information.

You have to hire more network administrators. Spend more money. Retrain. Reconfigure.

And every time you grow, even a little bit, your network gets harder to manage, harder to use, and harder to fund.

Switching over to VINES isn't just smart, it's easy.

It's a question of architecture. A network like Novell's NetWare® is not an integrated system. Adding new users of services means having to update user profiles, retrain employees, and troubleshoot connectivity problems.

Banyan's architecture is designed to grow effortlessly. (Ease of growth is why we're the leader in true enterprise-wide pc networking.)

Whether you're growing from 10 users to 100 or even 10,000, your Banyan VINES® *architecture stays the same.*

Even if your network grows to span continents, the cost of managing the network will be kept to a minimum.

VINES can save you a fortune. That's indisputable.

What's more, VINES' open, standards-based architecture lets you adopt whatever new products come along–whether it's one of today's powerful new "super servers" or some of the thousands of network-based applications available for VINES.

Whatever your specific requirements–Global Naming, Security, WAN interconnection, Global Administration, Multi-processing, or Multilingual capability–Banyan can deliver immediately. Now.

Easy, economical growth must be planned in. It can't be tacked on.

You don't have to scrap the network you have now in order to switch to VINES. We can make your transition simple and inexpensive.

Get the facts. We've prepared a booklet, "THINGS THEY DON'T TELL YOU AT NOVELL PRESENTATIONS." You'll find it a useful source of comparative information.

More than a million people now use Banyan VINES, in operations ranging from a handful of users to the world's largest pc-based global networks.

The more you know, the more you will want Banyan. We can simplify the use and management of your distributed network.

Call 1-800-828-2404 for a free brochure.

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Suppliers form cell-relay team

Four vendors and telecommunications carriers announced the formation of the ATM Forum at Interop '91 earlier this month. The move represents the first agreement between private and public network suppliers to implement a common user interface for Asynchronous Transfer Mode, also known as cell relay. The common specification is expected in March 1992. The four founding forum companies are **Adaptive Corp., Cisco Systems, Inc., Northern Telecom, Inc.** and **U.S. Sprint Communications Co.**

Cincinnati Bell Telephone Co. said it plans this month to complete construction of the country's first Synchronous Optical Network (Sonet) and that it will test the service in the fourth quarter and make it available to business customers in downtown Cincinnati during the first quarter of 1992. All regional Bell operating companies will test and/or deploy Sonet this year, according to **Bellcore**, the research arm of the Bell telephone companies.

Reversing a yearlong trend, AT&T's share of the long-distance market, as measured in interstate switched minutes, declined in the second quarter of 1991 to 61.8% from 63.2% in the first quarter, the Federal Communications Commission said. Since mid-1984, when the carrier held 84% of the market, AT&T's share has declined steadily, although it had been nosing up since the middle of last year. AT&T's market share is closely watched by both sides in the argument about whether AT&T has market dominance and whether it should be further deregulated.

Interop shows LAN advances

BY JOANIE M. WEXLER
CW STAFF

SAN JOSE, Calif. — Local-area networking strides kept pace with wide-area advances on the Interop '91 trade show floor earlier this month.

For example, a January 1992 shipping date has been set by Crescendo Communications, Inc. for the industry's first products supporting 100M bit/sec. LANs over voice- and data-grade unshielded twisted-pair wire. Crescendo's per-connection price is about $2,500; most 100M bit/sec. connections today require fiber-optic cabling and components and cost at least $6,000 per connection.

Crescendo's announcements join products expected to ship next month from Digital Equipment Corp. and Synoptics Communications, Inc. that support 100M bit/sec. over shielded twisted-pair wiring to protect many users' existing cabling investments while migrating them to higher speed networking. The moves could also serve as competition to drive down the price of fiber attachments, analysts said.

Crescendo said it has tackled the emissions challenges that have for the past year faced an American National Standards Institute working group and a consortium of vendors spearheaded by Crescendo in putting the high-speed data transmission rates over both voice- and data-grade copper wiring.

Because of the greater emissions associated with copper wiring compared with fiber, Crescendo's technology has internodal distance limitations. Its products are thus targeted at applications in which high-performance workstations directly attach to the 100M bit/sec. network, rather than at forming a more sprawling backbone network.

Distance limitations

The distance between nodes using Crescendo products is limited to 50 meters with voice-grade wiring and 100 meters with data grade, which reportedly accommodates up to 99% of wiring closet connections. These distances compare with two kilometers using multimode fiber and 80 kilometers using single-mode fiber specified in the official Fiber Distributed Data Interface standard for 100M bit/sec. networking.

The twisted-pair products Crescendo has announced are an $8,990 10-port dual-attached concentrator and $1,495 adapter card, initially to connect Sun Microsystems, Inc. workstations. High-performance workstations, such as Sun's Sparcstation, tend to run the bandwidth-intensive applications that justify use of 100M bit/sec. in a direct-attached LAN.

The smart wiring hub was not to be outdone at the show either. Two vendors announced "hub cards," low-end wiring hub solutions for condensing the concentration and management of net-

Continued on page 84

University system to get educated in ISDN

ON SITE

BY JIM NASH
CW STAFF

SAN MARCOS, Calif. — Figuratively speaking, technology has come through the front and back doors. Now, it is coming up through the floorboards of what will be the first U.S. university built in 20 years.

California State University (CSU) has chosen Pacific Bell and Northern Telecom, Inc. to help build a communications network branching from a 720-ft, T-shaped tunnel below this Southern California town. During the next year or so, those branches will sprout fiber-optic tendrils connecting each floor in every building at CSU-San Marcos as well as the local public library and two large community colleges.

The university's goal is to make its 20th campus — which opened in leased offices last fall — a facility based on technology that should become mainstream only in the 21st century. Pat Farris, director of business services at CSU-San Marcos, said CSU, Pac Bell and Northern are developing a 10-year plan based on what is being called an advanced telecommunications platform.

"Two years ago, we went to vendors and said, we want to be a university of the 21st century," Farris said.

At least at the moment, fiber and Integrated Services Digital Network (ISDN) technologies will play a major role in putting San Marcos on the cutting edge.

"The campus is dirt right now," said Jim Horalek, Northern's director of public-sector marketing, referring to the 45 acres currently being developed as the school's core. Everyone involved expects the university to mature quickly, bristling with computers capable of simultaneously accessing image, sound and text files as well as translating from voice to text and back.

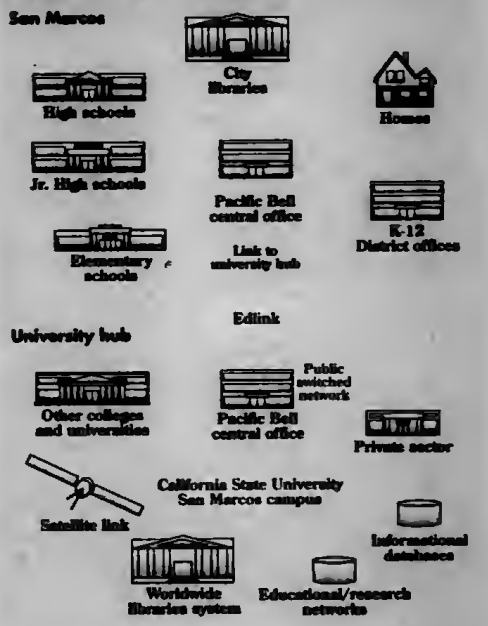
Team effort

Horalek said the three firms are now focusing on a trial for two-way interactive video services. Northern is donating four DV-45 video coder/decoders. It is up to the school to pick up monitors and cameras, he explained. The Nashville-based company is also giving CSU-San Marcos 200 ISDN telephones for future but as yet unseen applications.

"We hope to show that wise, upfront investments in technology will pay off" in lower infrastructure costs down the line, Horalek said. He said such investments should provide a consistent technological base on which to build, rather than having a patchwork of equipment and technology that is difficult to manage and maintain. They also want to show that fiber and ISDN can be installed, integrated and brought on line by the fall of 1992, when classes are due to be switched to their permanent homes.

Making the connection

The fiber network at California State University will extend beyond campus to link the school with public facilities



CW Chart: Michael Siggins

One of the challenges, Horalek said, will be completing this phase on schedule.

He admitted that the San Marcos project is unique in that communications for what amounts to a small town will be built from the ground up on ISDN. There will be few things to blame if performance falls below expectations. Integration of actual computers is still up in the air while school officials mull hardware choices, Horalek explained. "We're confident the fiber products will meet their needs," he said.

Costs for the 10-year plan have yet to be finalized, Farris said. A spokesman for Pac Bell in San Francisco said that about $1 million in equipment and services will be spent by his company and Northern through the end of 1994. That does not included tariffed services and equipment already installed by either company at the site.

Switched network coalesces in Europe

BY ELISABETH HORWITT
CW STAFF

GENEVA — Like a web cooperatively spun by many spiders, a network of 2M bit/sec. switched connections is growing across Europe.

More than a year in the making, the coalescing network was a major topic of conversation at the recent Telecom '91 show here, according to Berge Ayvazian, a vice president at The Yankee Group, a Boston-based research firm. "This is very hot stuff," he said.

Because of Postal Telephone and Telegraph (PTT) authorities' monopolies of switched services, high-speed bandwidth on demand for data services has been scarce to nonexistent in Europe, Ayvazian said. "Dedicated lines and X.25 value-added networks have been the only way to go" for companies that needed high-speed data services, he said.

The service allows users to call up on-demand bandwidth ranging from 64K bit/sec. to 384K bit/sec. in 64K bit/sec. increments, according to Egied Dekoster, a chief engineer at Belgium PTT Regie des Telegraphes et Telephones. The European carriers then interconnect over 2M bit/sec. links.

The network, called European Broadband Connection Trial, is not, in fact, a trial, but a series of agreements among European countries to interconnect their respective 2M bit/sec. services, Dekoster said. All of the Scandinavian countries, the Netherlands, Switzerland, Germany and the UK's Cable & Wireless already offer the interconnection service. Portugal and Belgium are working on links, and Italy and Spain are expected to join the trial shortly, Dekoster said.

Bilateral switches

Belgium announced at Telecom '91 that it expects to provide its own bilateral switched 2M bit/sec. connections early next year. Initial links will be to the UK, Switzerland and Germany, which can act as liaisons to other countries' services, Dekoster said.

By providing users with the ability to exchange information over cost-effective, high-speed lines, Europe can "leapfrog the U.S.," which has yet to provide such connections on a widespread, transparent basis, either within the country or between the U.S. and various European countries, Ayvazian pointed out.

While Primary Rate Integrated Services Digital Network (ISDN) could potentially support a similar service in Europe, standards organizations have not gone beyond providing a 64K bit/sec., pan-European version of ISDN, Dekoster said.

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HP, Sun up FDDI support

Rivals Hewlett-Packard Co. and Sun Microsystems, Inc. expanded their support of the 100M bit/sec. Fiber Distributed Data Interconnect (FDDI) network standard this month. HP announced FDDI support for the reduced instruction set computing-based HP Apollo 9000 Series 700 workstations. The FDDI workstation cards are scheduled for November availability and are priced at $5,995.

Sun announced the FDDI/S network interface for single-attach FDDI links to Sbus-based systems, which include the Sun Sparcsystem workstations and SunOS-based systems. The board, with software, is priced at $2,995.

Both products are said to comply with American National Standards Institute and Station Management (SMT) 6.2 specifications.

Sun also announced a software upgrade for its FDDI boards for Motorola, Inc. VMEbus systems that is said to provide SMT 6.2 compliance and links to Sun's Sunnet Manager platform.

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Guide offers help on E-mail rules

BY KIM S. NASH
CW STAFF

The phrase "workplace privacy" may seem like an oxymoron to some corporate workers because most U.S. companies have not established clear privacy policies, according to the Electronic Mail Association (EMA).

The group recently published guidelines for setting up E-mail rules. The report, "Access to and Use and Disclosure of Electronic Mail on Company Computer Systems: A Tool Kit for Formulating Your Company's Policy," advises the following:

• **Just do it.** The majority of U.S. businesses have no E-mail or computer privacy policies, EMA Executive Director Michael Cavanagh said. Information systems managers should meet with people in the human resources and legal departments to get the ball rolling.

• **Test the waters.** Determine what corporate actions are allowable — and desirable — by measuring your new rules against real-life scenarios. Can a manager regularly review files kept on subordinates' computers? Can managers access computer or E-mail files in an employee's absence? What about same-level colleagues or subordinates?

• **Third-party access.** Should people outside the company have access to your internal E-mail? Here, IS managers might have to consult state and federal laws. For example, if a chemical company spills toxic materials, can citizens who live near the scene get a gander at the firm's messages to look for internal dialogue related to the matter?

Furthermore, cases such as the $75 million suit brought by former employee Alana Shoars against Epson America, Inc. for allegedly conducting illegal monitoring of employee E-mail [CW, Oct. 14] have helped bring electronic privacy tangles to light.

To help prevent what Cavanagh called "ugly" public confrontation about what is fair and/or legal, firms must take a long look at their E-mail privacy rules and they should do it soon, he said.

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Tandem to sell ICS

BY JEAN S. BOZMAN
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. recently announced that it will begin marketing a new type of proprietary computer system that is compatible with several kinds of Integrated Services Digital Network (ISDN) telecommunications switches.

The new Tandem Nonstop system will be an application platform for telephone companies and other information providers, according to Tandem. The system will connect to both primary-rate ISDN and basic-rate ISDN services.

Due to a series of recent federal court rulings, AT&T and the regional Bell operating companies will be able to deliver information services such as shopping guides, real estate listings and banking services over telephone lines.

The Tandem platform will serve as the back-end computer that will provide on-line transaction-processing capability for such applications, a Tandem spokesman said.

Tandem plans to sell its ISDN Communication Subsystem (ICS) in several world markets, including North America, Europe and Japan. For the company to do so, the ICS computer must be adapted to varying world ISDN standards in those geographic regions.

The ICS will range in price from $8,000 to $21,000 for hardware alone. Software will be provided through a onetime license fee of up to $75,000 — or through monthly license fees, Tandem said. ICS systems will become available in the first quarter of 1992.

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Netronix bridges beat out Big Blue

Southern Pacific switches from IBM to smaller firm's handier devices

ON SITE

BY JOANIE M. WEXLER
CW STAFF

SAN FRANCISCO — In an era that has managers comparing protocols, interfaces, throughput, vendor reliability and myriad other factors when making networking decisions, it is probably easy to overlook simple convenience.

That happened recently to Southern Pacific Transportation Co., a large IBM shop, when it began phasing in Token Ring local-area networks amid its terminal-to-host traffic. The firm assumed that going with IBM source-routing bridges to interconnect LANs was "safe because we had all IBM systems," said Brijet Neff, communications hardware specialist at the railroad company. Source routing is a method of exchanging data between Token Ring networks.

After three months, however, the firm recycled IBM's devices into personal computers and swapped in Netronix, Inc. source-routing bridges. The reasons were not flashy: The Netronix bridges sported LED network status indicators on their front panel and an audible alarm that penetrated a locked wiring-closet door to alert nearby staff members to network problems.

The features allowed the network manager to do basic network troubleshooting in the closet where the 24 bridges are stacked "so that we don't have to lug a PC around" for running diagnostics to isolate inactive nodes, Neff explained.

Just before the swapout of the IBM equipment, Neff decided to replace dumb Token Ring wiring hubs with intelligent wiring centers so she could tell "which side the network problem was on: the bridge or the wiring. Then I started looking for bridges that are 100% IBM-compatible, and the only two I could find were from Netronix and Olicom [USA]. The Netronix came ahead at that point just because of the visual display."

Southern Pacific is currently beta testing — and said it intends to purchase — a new version of Netronix bridges that al-

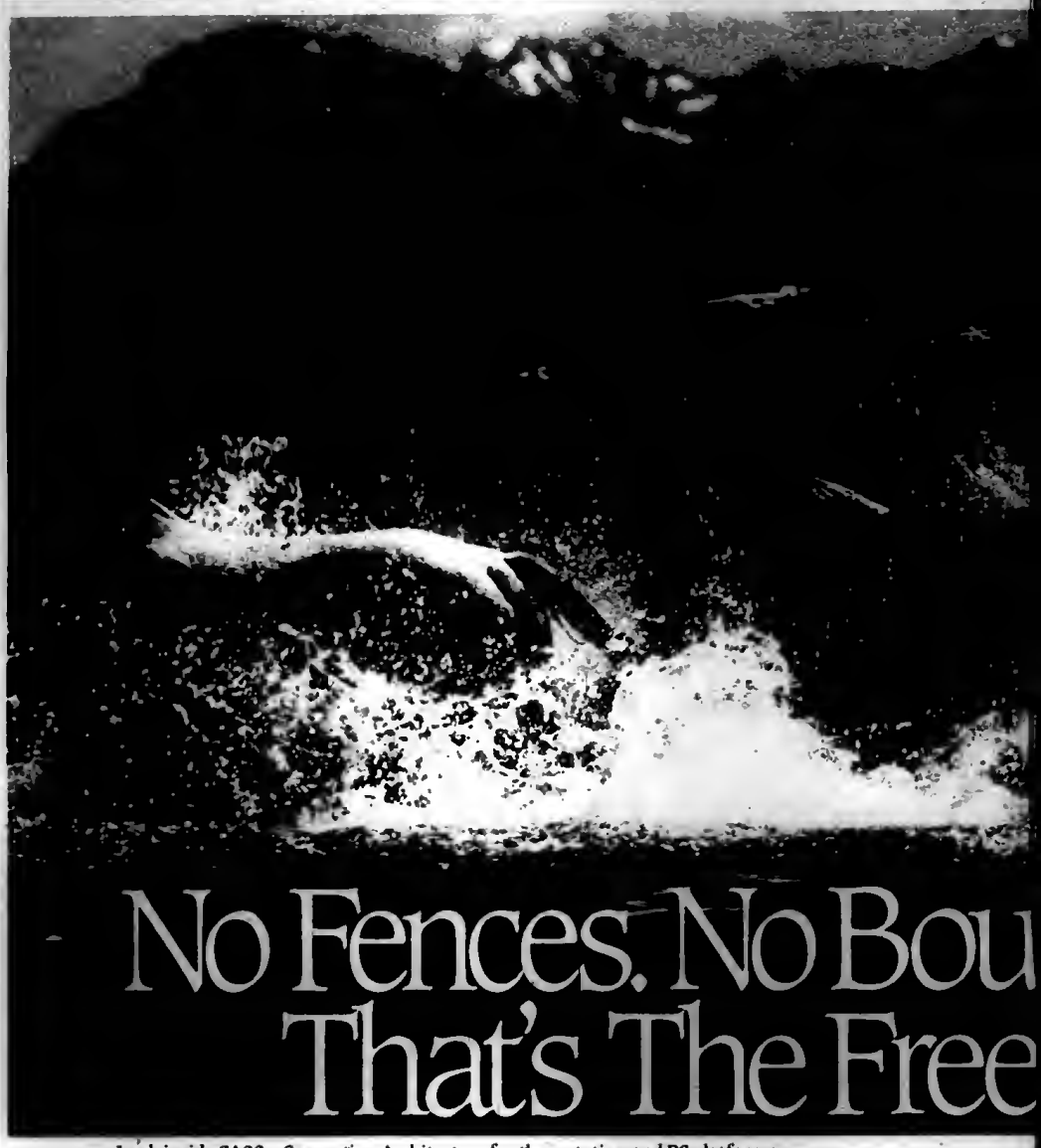
Just the facts

Source-route bridging allows Token Ring networks to exchange data. The scheme uses the end-station to determine which route a data packet will take through an internetwork.

This contrasts with the lower level **transparent bridging** scheme used between other types of LANs, in which the bridge determines whether a data packet is intended for a node on the same physical ring. If not, a transparent bridge broadcasts the packet to stations on all LANs it is connected to. Most bridges today are **learning bridges**: Once a packet traverses the bridge to an unknown destination, the bridge learns the destination and route and stores the information in a table for the next transmission.

Source-routing transparent (SRT) is a draft standard for supporting both source-route bridging and transparent bridging in one device. It does not allow source-route nodes to intercommunicate with transparent nodes; SRT bridges support both schemes separately in one physical box.

JOANIE M. WEXLER



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lows the network manager to reconfigure the devices from the front panel using an LCD.

Both versions of Netronix bridges support source-routing transparent (SRT), a way to support two bridging schemes within one device. Southern Pacific, however, is set to introduce Ethernet LANs into its environment next month, which spells multiprotocol routers for Neff.

Netronix's latest architecture is software downloadable to allow future routing capabilities, according to the company. However, the routing capabilities will probably not be ready in time for the railroad. Neff said she is currently testing routers from a stand-alone router vendor among five locations at 56K bit/sec. to T1 speeds and intends to purchase the units.

Jerry McDowell, a director and principal analyst at research firm Dataquest, Inc. in San Jose, Calif., noted that while Netronix "needs to look at the next step" soon because "there isn't much profitability in just selling bridges in what is becoming a commodity market," routers may not impact bridge sales significantly because there are fewer "routable" protocols in Token Ring than in Ethernet environments.

McDowell added, however, that "IBM doesn't support SRT as well as Netronix. That gives users hope that the old glass house is shattering. This is another stone to hit the glass."

Netware opened to TCP/IP

BY JIM NASH
CW STAFF

Network managers looking for a way to hold down internetworking costs reacted favorably to a new software-only Transmission Control Protocol/Internet Protocol (TCP/IP) gateway for Novell, Inc. networks.

Recently, a month after its founding, Ipswitch, Inc. in Reading, Mass., announced shipment of its first product, Catipult, a TCP/IP gateway for Novell's Netware Version 3.11 file servers. Because Catipult is server-based and can support up to 30 simultaneous TCP/IP sessions, it can save money for companies that otherwise would have to pay per-user fees for workstation-based software.

Sudesh Kumar, a Kosmos Computer Consultants Ltd. networking consultant working with Ontario Hydro in Pickering, Ontario, said consolidating TCP/IP gateways onto a single server has definite cost advantages. Workstations at Ontario Hydro that need access to both TCP/IP and Novell's Internet Packet Exchange protocols are proliferating.

Novell supports TCP/IP applications but only through its LAN Workplace for DOS software, which is loaded on each workstation that requires TCP/IP applications.

Catipult can be loaded on any OS/2-based personal computer and works with workstations on Arcnet, Token Ring, Ethernet and broadband architecture. It offers File Transfer Protocol, Telnet and TN3270 emulation applications.

Cheers for Catipult

Although be is unlikely to use the product in any broad fashion, David Walker, a network manager at the University of California at Irvine, said Catipult has merit. Walker said one network on campus is on Arcnet, and its users have resisted moving to Ethernet, as has most of the school.

"UC-Irvine has been client-based" to date, Walker said. That is mostly because many of the applications, such as those to access relational databases on TCP/IP networks, do not run on gateways. Plus, be said, the school has tended to minimize overhead on servers.

Nonetheless, Walker noted, Catipult supports TN3270 terminal emulation. He said be is not certain LAN Workplace for DOS works with that emulation package. Catipult would make that a moot point.

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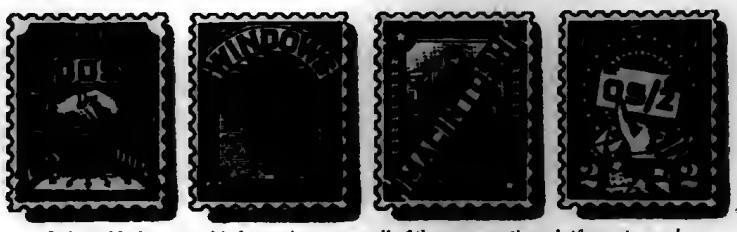

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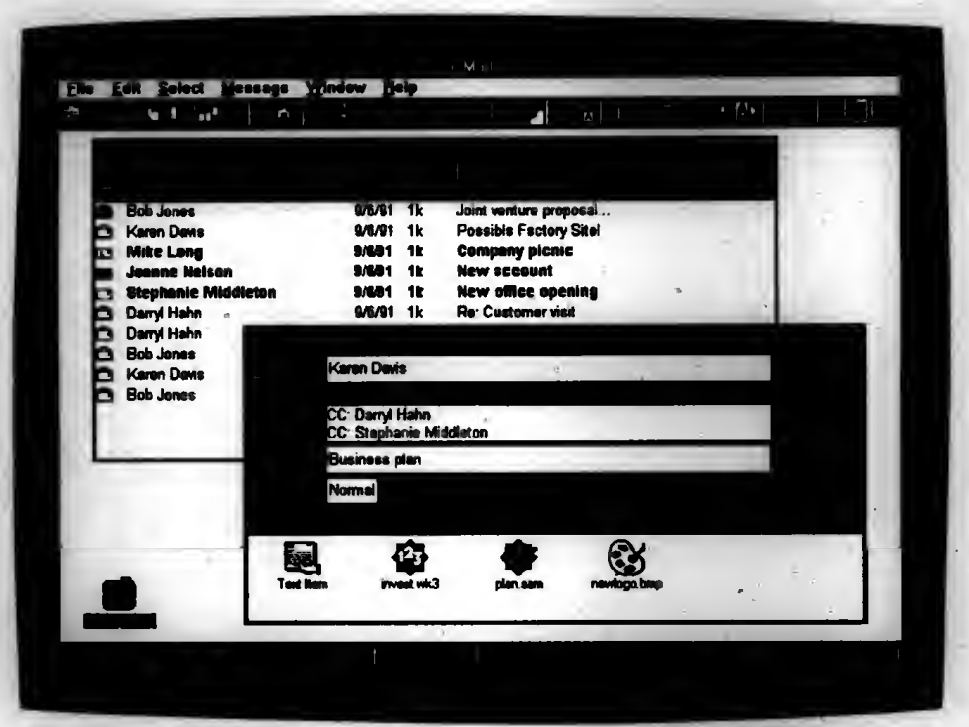

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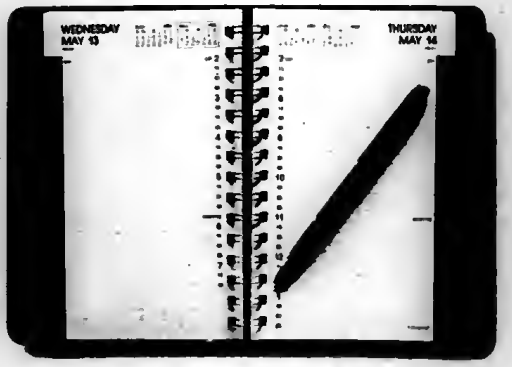

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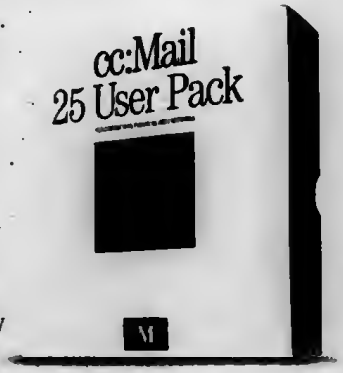

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Coffee lovers unite with SF Net

BY J. A. SAVAGE
and JIM NASH
CW STAFF

SAN FRANCISCO — Forget cyberpunk. Enter cyberchic.

At Brain Wash, where the aroma of espresso collides with the odor of Tide, San Francisco's tattooed and leather-clad hipper-than-thou clientele can do their laundry, have coffee and talk to like-minded souls — who don't have to be in the same coffeehouse.

Slip the bartender an extra buck, and along with the double decaf cappucino, customers get 15 minutes of time on SF Net's computer tables. Scattered in five coffeehouses around the city and two across the bay in Berkeley, Calif., the network is aimed at irregular computer users. "Typically, those who use computers are white collar," said Wayne Gregori, founder of SF Net. "We're trying to offer technology to people with alternative lifestyles."

SF Net is geared to those who enjoy a good critique. Users can choose formal discussions of politics, current events, music, movies, sports and personals. They can chat on-line with the other cafe-ophiles and those who dial in from home for a small monthly fee.

In the politics section, users can have deep philosophical discussions with, for example, author and high-profile left-wing national policy critic Noam Chomsky. In the personals ads, users record their thoughts on gender angst more often than they try to get a date.

The $5-per-month charge (or $1 for 15 minutes, which is split with the coffeehouses) is not where Gregori gets the money to continue to expand. That is fueled by the Compact Disk Exchange. For an $18 fee, users can access listings of used CDs "from Newfoundland to Newport Beach," he said. While certainly not a big money-maker, it has allowed Gregori to continue building the cafe/monitor/modem tables, which cost about $500 each, and enlarging his network.

The system is "stupidly simple," Gregori said. In his kitchen sits an Intel Corp. 80386-based dedicated server. His "network" consists of 16 phone lines the phone company wired into his apartment. He uses off-the-shelf electronic mail gear.

"It's thrilling to watch people use the network," he said. "I want to make it a politically powerful tool. People can state their opinions somewhat anonymously, and they get into sophisticated conversations." Gregori added that eventually he wants to compile opinions into a newsletter and send it to elected officials.

Currently, the system has a capacity of 64 lines, which Gregori wants to translate into 25 tables plus home lines. Then, it is off to Seattle (a major coffeehouse city) and New York.

Interop

CONTINUED FROM PAGE 75

work node connections onto boards that fit into a slot in a personal computer.

Cabletron Systems, Inc. unveiled a $99-per-port hub card for connecting up to nine managed 10Base-T network nodes. The cards reportedly comply with a just-announced hub management interface specification from Novell, Inc. for integrating the hub cards into Novell Netware servers.

Chipcom Corp. introduced eight-port Token Ring hub cards, which are also Netware server-compatible. The company said the cards integrate file server, network concentrator and routing software into a single PC chassis. Chipcom's cards reportedly support Token Ring LANs at both 4M and 16M bit/sec. Token Ring standard speeds over both shielded and unshielded twisted-pair wiring.

Senior Writer Sally Cusack contributed to this report.

INTERNATIONAL BRIEFS

Sprint to serve UK, Holland

U.S. Sprint Communications Co. has announced several contracts to provide private packet-switched data networks to financial institutions in the UK and Holland. Under a contract estimated at more than $10 million, Sprint will provide TP4900 switches and a network management system to link more than 1,000 automated teller machines for Rabobank Nederland. National Westminster Bank in the UK will use Sprint's packet switches to interconnect hosts and local-area networks. The Yorkshire Building Society will use the switches to link 140 branches around the UK, Sprint said.

The Soviet Union's first commercial cellular telephone system was inaugurated last month. Called **Delta Telecom**, it is a joint venture between US West International Holdings, the Leningrad City Telephone Network Production Association and the Leningrad Station of Technical Radio Control.

For the first time, combining Open Systems with OLTP makes

NEW PRODUCTS

Local-area networking hardware

The Easyoffice Network, a low-cost resource-sharing system, has been announced by Server Technology, Inc.

The network allows personal computer users to share resources such as printers and modems and to transfer files and messages. No network operating system or communications boards are required, the company said. Cabling is included and connects through the standard PC communications port.

A four-node system costs $499.95, and an eight-node system costs $749.95.

Server Technology
2332-B Walsh Ave.
Santa Clara, Calif. 95051
(408) 988-0142

Vortex Systems, Inc. has announced a fault-tolerant storage product.

Vinesmirror is a hardware solution that simultaneously writes data from the server to two disks under Banyan Systems, Inc.'s Vines environment. In the case of a failed drive, the product broadcasts an explanation of the cause to the network manager and continues to store data on the alternate disk. It also includes 4M bytes of high-speed cache memory to improve I/O performance.

Vinesmirror costs $8,995. It includes an intelligent disk controller, four discrete small computer systems interface channels, cabling and a floppy disk drive.

Vortex Systems
800 Vinial St.
Pittsburgh, Pa. 15212
(412) 322-7820

GEC-Marconi Software Systems, a division of GEC Avionics, Inc., has announced Printerlink.

Printerlink is a plug-and-play resource-sharing hardware product. One component connects a personal computer to any parallel printer; a second component links PCs up to 150 feet apart in a daisy-chain configuration. Printer sharing is transparent to the users. Printerlink includes 128K bytes of buffer memory.

Each unit costs $150, with 39 feet of RJ cable and five feet of parallel cable.

GEC-Marconi
Suite 450
12110 Sunset Hills Road
Reston, Va. 22090
(703) 648-1551

Local-area networking software

Frontier Technologies Corp. has announced Super-TCP for Windows and Netware.

The software product allows users to maintain concurrent access to Transmission Control Protocol/Internet Protocol and Novell, Inc. Netware for personal computers under Microsoft Corp.'a Windows 3.0 environment. Features include object-oriented file transfer, multiple-document electronic mail and support for Simple Network Management Protocol.

The product costs $495.

Frontier Technologies
10201 N. Port Washington Road
Mequon, Wis. 53092
(414) 241-4555

Network management

Comcorps, a division of HHP, Inc., has announced new telecommunications facility management software.

TFM-Entry lets users maintain a complete inventory of physical equipment and software installed in voice and data networks, along with records of assignments and service requests and information.

List price is $3,995.

Comcorps
Suite 300, Building 10
750 Hammond Drive N.E.
Atlanta, Ga. 30328
(404) 252-1222

Trellis Software, Inc. has introduced a server-based applications metering package for Banyan Systems, Inc.'s Vines.

The Trellis Application Meter controls the number of users with access to applications on the network, preventing use of unlicensed copies. Users denied access to an application can reserve the next available copy, and the Meter notifies the user when it becomes available.

A one-server license costs $995. Licenses for additional servers, up to a total of 10, cost $495.

Trellis Software
85 Main St.
Hopkinton, Mass. 01748
(508) 435-3066

Host-to-host

Goal Systems International, Inc. has extended the functionality of its OPS/MVS automated systems operation software to additional platforms.

The new OPS/Relay component of OPS/MVS provides bidirectional communications between MVS systems and the IBM Application System/400 as well as platforms from Digital Equipment Corp. and Tandem Computers, Inc.

Pricing ranges from $7,500 to $25,000.

Goal Systems International
7965 N. High St.
Columbus, Ohio 43235
(614) 888-1775

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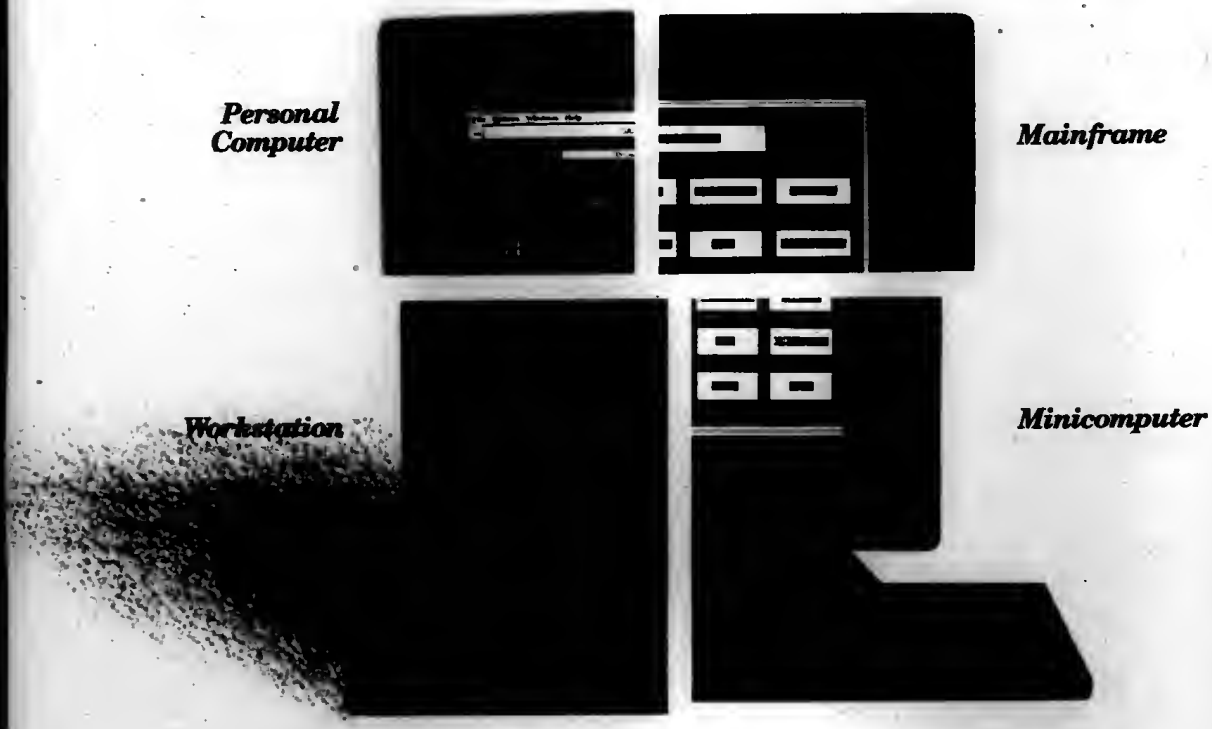

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No matter how you decide to configure an application, you're assured that each slice will communicate with all the others. That's because the SAS System fully supports industry-standard communications protocols, providing full connectivity across platforms.

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MANAGER'S JOURNAL

EXECUTIVE TRACK

Kenneth R. Bender, former chief information officer and vice president of information systems at Southwestern Bell, has joined the **Executive Insight Group** IS consultancy in Bryn Mawr, Pa., as vice president of quality programs.

Bender will be responsible for assisting clients in developing quality initiatives in their information systems functions.

Bender retired earlier this year after 27 years at St. Louis-based Southwestern Bell. He joined the firm in 1964 from AT&T as head of the company's first IS group. He became vice president of data systems in 1977 and led the implementation of a quality process in IS in 1984.

In 1983 and 1984, Bender chaired the Bell System Council responsible for the planning and transition of software programs from AT&T to the Bell operating companies. He is a past member of the Council of North American Information Management Executives of the Conference Board.

•••••••••

Lynn Strouse has been named to the newly created position of senior vice president of international automation in the information services unit of **National Car Rental System, Inc.** in Minneapolis.

His primary responsibilities will include coordinating and interfacing worldwide technology between National and its international car rental partners, which are Tilden in Canada, Europcar in Europe, the Soviet Union, Africa and the Middle East and Nippon Rent-A-Car in the Pacific Basin.

Strouse will also act as the Electronic Data Systems Corp. international car rental operations consultant. EDS handles all of National's data processing, computing and communications services, including systems development.

Strouse has been with National's information services area since 1987. He previously worked for The Hertz Corp.

Paid research not key to IS plans

Users say data plays a role in their thoughts, but it is not crucial in decision-making

BY PATRICIA KEEFE
CW STAFF

The value of computer market and technology research to the IS management community depends a lot on who is doing the talking.

A handful of market researchers — among them the Meta Group, Inc., Gartner Group, Inc., Forrester Research, Inc., International Data Corp. and Input, Inc. — are paying the bills and then some with research aimed at end-user and information systems needs.

But how useful is the data in managing a large IS shop?

Users acknowledge that data plays a role in their deliberations, but they say it is not a crucial element in any decision-making. Research firms maintain that IS clients look to their services to provide an outside perspective and critical guidance in an array of areas, including product purchase planning, vendor negotiations, product comparisons and standards definition and setting.

According to a vice president at one research firm, his organization's reports comprise a "vital piece in the decision-making process."

In particular, large corporate IS clients are looking for guidance on technology standards, he says. The IS community is moving away from the hierarchical environment of 20 to 30 years ago, where strategy and standards came down from on high in the corporation. In today's flatter and more often decentralized organizations, he says, standards are often done away with.

Jack Gotfield

"There's a lot more give and take between departments, and so it helps to have an outside perspective to eliminate a lot of arguing," the vice president says. He also claims that some clients find it less risky to present an opposing viewpoint to their bosses when backed up by an outside opinion.

But despite generating a substantive revenue stream from the IS audience — said to range from $10 million to $90 million annually depending on the firm — much of that research is considered by many IS executives and managers to be merely helpful and not at all critical to the final decision-making process. None of the IS managers interviewed said they would hang either a budget or a project on the views espoused in any report.

"I don't think we place any great reliance on it," says Jude Gartland, a vice president at Lehman Brothers in New York.

Pfizer, Inc. is an example of a company that blows hot and cold on market research, depending on the particular group. Todd Greeno, a manager in the internal consulting group, says that his corner of Pfizer does a lot of its own technical research in-house, in part by maintaining strategic alliances with key vendors and through visits to other sites. "We don't ignore what market research firms have to say, but we are not an avid subscriber to any of them per se," he says.

As a result, these managers say, none of them has ever been burned by the contents of any report or even led

Continued on page 92

Cost control worries retail managers most

BY ELLIS BOOKER
CW STAFF

Still mired in recession and dismal prospects for the upcoming holiday season, retailers are lining up behind the idea of cutting costs in their information systems departments, according to a survey of U.S. retail firms published last month.

Ernst & Young's *10th Annual Survey of Retail Information Technology Expenses and Trends* found that cost control was cited by 24% of the 154 companies polled as the biggest issue facing IS heads. Cost-cutting outdistanced other issues such as systems implementation and integration (18%), implementing a Quick Response program (12%), system conversions or upgrades (11%) and systems development (9%).

Among large department store chains, the number of firms citing cost control as their top IS priority soared to 46%. Pressed by the recession, many retailers have looked to improving efficiency by reducing their IS staffs through outsourcing arrangements.

But downsizing has not been driven by recent economic conditions, according to one retail IS executive.

"This has been happening for years, not because of the current economic doldrums but because of good business reasons," said Mark Scimeca, MIS director at Conran's Habitat in White Plains, N.Y. Outsourcing is a popular solution, but Scimeca said it is short-sighted. "You loose a lot of the culture of the company if you take the process outside," he said.

Of those planning to make changes, the survey found, 53% will alter their hardware configuration, 24% will spend less on IS development, 35% will reduce head count, and 32% said they will outsource some IS functions.

A startlingly high 62% of those firms that now outsource or plan to outsource said they are targeting systems development. However, Ernst & Young's definition of outsourcing includes contract programming for specific projects.

Another 27% of the firms plan to outsource systems operations; 22% plan to outsource end-user computing support; 20% plan to outsource communications/network management.

Among the firms planning to migrate applications to smaller platforms, more than a third cited increased operational efficiency and increased price/performance of hardware as the reason for downsizing. But more than half said they were evaluating these options in reaction to poor business conditions.

AS THE PACE OF CHANGE ACCELERATES,
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Management is always concerned about information technology's effect on the bottom line. We can help you demonstrate information technology's contribution to directly improving flexibility, speed to market, even cost control.

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Consulting is one way we help. We can also help develop systems. We can help integrate systems. We can provide partial or complete systems management. We can supply you with all the support *you* deem necessary.

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Regardless of task or time, we can help you turn a changing business environment into a competitive advantage for your company. To learn more, write EDS, 7171 Forest Lane, CW11, Dallas, TX 75230. Or call (214) 490-2000, ext. 2111.

EDS

TAKE ADVANTAGE OF CHANGE™

IS the ticket for Blockbuster growth

BY ELLIS BOOKER
CW STAFF

FORT LAUDERDALE, Fla. — Business at Blockbuster Video is boffo, as they say in the Hollywood hills.

With revenue of $1.1 billion last year, parent company Blockbuster Entertainment Corp. estimated it holds 10% of the U.S. video rental marketplace — and information technology helps keep video rentals whirring along.

"When I joined in July 1988, they had 230 stores ... 30 months later, there were more than 1,500 stores," said Wilbur L. Smither, vice president of information systems.

Smither presented the Blockbuster IS success story at the annual Retail Information Systems Conference (Riscon) in Chicago.

Six years after opening its first store in 1985, Blockbuster now claims some 1,900 video stores worldwide and 1 million-plus videotape rentals a day.

In the last year, this phenomenal growth reached the fever pitch of a new store opening every 17 hours, on average. Such expansion demanded that Smither's centralized IS group devise computing standards for stores, half of which are owned by franchisees. Information technology, according to Smither, supports three primary goals: customer service, merchandising and franchise control.

The corporation's home-office data processing staff is strikingly small for a billion-dollar company. There are 15 systems development personnel and another six IS employees who run a Digital Equipment Corp. Vaxcluster and an IBM Application System/400.

The AS/400 runs corporate financial and administrative applications, but for purposes of operations support, Blockbuster is primarily a DEC shop. DEC's Microvax is the standard in-store processor, but the company recently began deploying DEC's new Deccashier, a point-of-sale (POS) terminal that combines a TV-420 terminal with a variety of POS peripherals.

Smither credited the "nimbleness" of DEC's distributed Network Application Support architecture as having allowed Blockbuster to sustain its frenetic growth curve. "I doubt that a centralized system would have permitted us to do this," he said.

Computerization, Smither noted, also directly aids in managing the franchise operation. Franchise stores are required to use Blockbuster's order-entry software and inventory databases, and store owners cannot enter a videotape title into their store system that does not appear on an approved title list that is downloaded to the stores nightly.

Even before a new Blockbuster Video store opens, IS plays a role. The initial store inventory is dictated by demographic data compiled for that particular market, Smither said.

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MANAGEMENT SHORTS

CSC Index probes new tech

CSC Index, Inc. has announced a new joint research consortium devoted to the impact of emerging information technologies on business and industry.

Index Vanguard is limited to 50 sponsors. Initial sponsors include **AT&T, Pfizer, Inc., Chevron Corp., Roadway Express, Inc.** and the **Principal Financial Group.** The annual sponsorship fee is $40,000.

Vanguard is offered by Cambridge, Mass.-based CSC Index in conjunction with **Hammer and Co.** President Michael Hammer and **Apple Computer, Inc.** fellow Alan Kay.

Cigna Information Services, the unit spun off from **Cigna Corp.** last year to sell information services to insurance firms, has landed client Fireman's Fund Insurance Company of New Jersey.

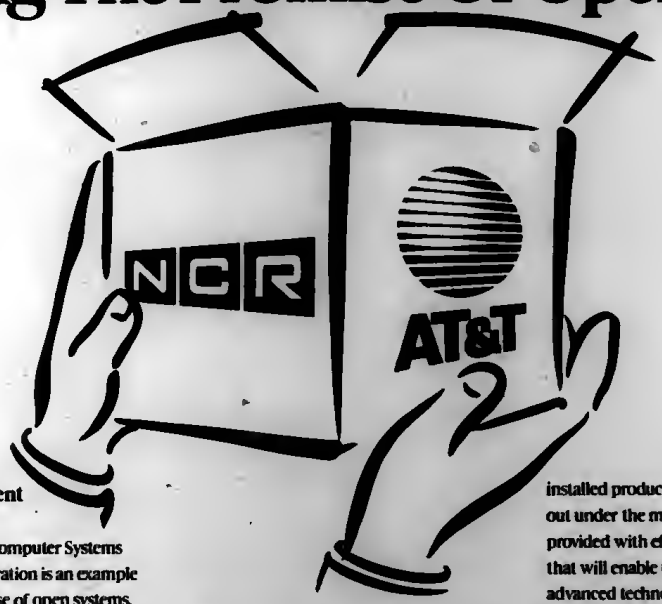
Cigna will provide systems and administrative support for Fireman's voluntary automobile insurance business in the state.

TRW, Inc.'s Space and Defense Systems Group in Redondo Beach, Calif., has signed an "interim outsourcing" deal with **Power Computing Co.**

The group will process its **Control Data Corp.** Cyber applications on a Cyber 990 at Power Computing's Dallas data center while it migrates the applications to in-house workstations and IBM mainframes. TRW users will be connected to the outsourcing vendor via high-speed communications lines by a target date of Nov. 30.

TRW's migration is slated for 14 months, but the contract is renewable, according to Power Computing. TRW expects to save more than $500,000 in processing costs during the migration.

NCR And AT&T.
Delivering The Promise Of Open Systems.



A Shared Commitment To Open Systems.

The merger of AT&T Computer Systems Division with NCR Corporation is an example of the tremendous promise of open systems.

Other computer industry mergers have become snarled in efforts to resolve conflicts between incompatible hardware and operating systems. AT&T and NCR, unique among major computer companies, have for years been committed to delivering totally open systems. As a result, we've been able to merge our product lines in months rather than years.

"This alliance should bring them into a market leadership position in the next 12 to 18 months. There's an unbelievable number of potential synergies between them, especially considering AT&T's expertise in telecommunications."

—Chris Christiansen, The Meta Group

From personal computers to enterprise servers far surpassing mainframes in power, to an innovative suite of enterprise integration software, to the world's most comprehensive set of networking and connectivity products, no one is delivering more complete, and powerful, open systems solutions.

A Merger Of Strengths.

NCR's Open, Cooperative Computing strategy has been acclaimed by analysts. And embraced by a fast-growing number of customers. NCR brings exceptional strengths to the merger. Worldwide sales and marketing expertise, an excellent reputation in terminal and transaction processing, expert financial management, and demonstrated skill in designing and manufacturing innovative products.

AT&T's contributions to the new organization provide a remarkable synergy. Supplementing NCR's open, end-to-end computer family with the world's most sophisticated and complete suite of open networking products. The strength of a $43 billion dollar international organization. And the R&D and cutting-edge technology resources of AT&T Bell Labs.

Honoring Commitments To Customers.

NCR's new strengths will be instrumental in attracting a wide range of new customers. But we've also spent a great deal of time and effort ensuring that past and current AT&T and NCR customers are well served.

All customer commitments of both organizations will be fully honored, of course. Customers who have currently installed product lines that will be phased out under the merged organization will be provided with effective migration strategies that will enable them to implement our advanced technology products without abandoning their current investment.

A World Leader In Open, Enterprise-Wide Information Systems.

NCR is now the Networked Computing Resource of AT&T. With the people, the products, and the financial resources to become a key force in developing the transaction society of tomorrow.

Open, Cooperative Computing is a completely open enterprise computing strategy backed by the resources of NCR and AT&T

Our goal is to create open, global computer networks that are as easy to use, as efficient, and as accessible as the telephone network is today.

NCR and AT&T. While others talk about the promise of open systems, we're delivering on it. For more information, phone 1-800-CALL NCR.

NCR
The Networked Computing Resource of AT&T

Open, Cooperative Computing.
The Strategy For Managing Change.

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Paid research

CONTINUED FROM PAGE 87

astray. The research simply doesn't get that close to the decision-making process.

Instead, it is generally used either as a barometer, as a way of defining an area or process, or simply as a way to take a broader look at a subject, users say.

In New York, Bankers Trust Corp. uses the research in part to follow up on technology trends. Pacific Gas & Electric Co. in San Francisco uses it to gain a sense of computer vendors' global directions, for which Senior Vice President Arthur Beckman says these reports are generally on the mark.

He also relies on the research to provide somewhat of a check and balance on technology choices. But other than that, "it's no great guiding light," Beckman says.

Time-saver

Research can sometimes save time by providing users with product or vendor overviews they might not otherwise have the time to collect. "We don't have the resources to conduct our own studies so we depend on outside services and publications," says Brian Cole, a computer systems analyst at the data management branch of the National Institutes of Health.

Subscriptions to reports from market research houses are typically combined with a variety of other research sources, which may include reports issued by an internal research group, self-generated surveys, input from user groups or computing societies, internal pilot tests and product comparisons and analysis pieces found in trade publications.

For example, at the Black & Decker Corp. in Towson, Md., market research purchased from the likes of Gartner Group and other firms is typically used in the first stage of a project, says Sid Diamond, vice president of worldwide IS.

"We use published reports sold to the general public for background on the product or new service under consideration," he says. "In the next stage, we talk to peers in other companies who may be using the product about their experiences, and then we do hands-on research or a prototype so we can understand what the thing is all about before we move [the service or product] throughout the company."

If looking at a mature, stable technology, Black & Decker IS uses the reports to get a "feel for a product from a given vendor," Diamond says. When trying to scope out an emerging technology or concept, Diamond uses the reports either to compare definitions or to track how things are moving in that particular area.

As Diamond gets closer to the purchase decision, he says that data acquired from his peers in other companies or from his own testing and judgment becomes more important than market research in determining whether a technology will fit his organization's needs.

Peer input is especially key for Diamond, who is involved with a number of professional associations, including a research board comprising fellow computer professionals who share data on various topics. He says he finds input from various IS management association roundtable discussions to be invaluable. "Many times, the reports don't cover that," he says. "Hands-on experience and word of mouth are more important."

The one area where users appear most likely to rely on market research data concerns product comparisons and rollout schedules. Ken Base, a systems analyst at TU Services, a division of Texas Utilities in Dallas, says he has made product decisions or has at least been able to eliminate the majority of products under consideration, based on research reports.

> MARKET RESEARCH can be helpful, but "it's no great guiding light."
>
> ARTHUR BECKMAN
> PACIFIC GAS & ELECTRIC

In these recessionary times, it might be easy to assume that organizations hard hit by budget cuts and downsizing might look first toward eliminating subscriptions to market research. Not so. As Diamond notes, "We're in a fluid technology area, so it's very important to keep on top of the [available] research." At best, users might become more selective, they agree, but none could conceive of eliminating purchases of outside research.

However, the impact of changing client interests, which is beginning to swing toward collecting more personal computer and desktop-oriented information, threatens to dam up some of that revenue stream.

Lehman Brothers is more apt to look for qualitative indicators, such as what are the top PC clones purchased by the Fortune 1,000. Oftentimes, Gartland says, he can find that data published in trade publications.

Base notes that more and more of the data he is looking for is available outside of these services, often free of charge, through computer trade publications. His group is more interested in planning for end users, mostly PC-based systems.

"With so much [free] information out there, paying someone to provide it doesn't make a lot of sense," Base says. Already, it is clear that his PC group will rely a lot less on market research than has the mainframe group.

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"The 'Holy Grail' in the information industry is cheap, bountiful and easy-to-use computing in package sizes ranging from the personal desktop computer (or even the intimate handheld computer) to the enterprise-wide megaplex, preferably with the ability to upgrade through all points in between with minimum hassle. That ideal came closer to reality...when NCR announced its System 3000 family."

"No other 'traditional' vendor has yet announced an intention, much less demonstrated the capability, of doing anything close to NCR's System 3000 family."

—George Lindamood, Gartner Group May 29, 1991

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NCR's System 3000 workstations are designed specifically for mission-critical, enterprise applications. Our experience in tough commercial, retail, and financial service environments, coupled with our expertise in putting more power into fewer components have resulted in systems that meet the most demanding requirements.

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At the high end, NCR System 3600 is the first open system with the power needed to handle mission-critical applications. It surpasses the performance of conventional mainframes. At a fraction of the cost.

System 3600's unprecedented performance is made possible by an innovative parallel processing architecture that allows compute- and I/O-intensive tasks to be shared by dozens of microprocessors. This gives the System 3600 raw computing power conventional mainframes can't match. Over 2000 MIPS today. Double that in the near future.

In certain applications, the System 3600 performs even better than those numbers suggest. For example, parallel processing is ideal for relational database access, where System 3600 offers as much as a 1000% speed advantage over serial architectures.

World-Class Database Engines.

Effective enterprise systems must be able to handle databases containing hundreds of gigabytes of information. Current mainframes can typically only manage 50-100 gigabytes. The System 3600 can handle databases up to 300 GB now, and far larger ones in the near future.

System 3000 database servers are also fault-resilient, offering 999% or greater availability. Combining high reliability with NCR hot-pluggable disk array technology makes System 3000 servers true world-class engines for mission-critical applications.

NCR System 3000. The power others talk about for tomorrow. Deliverable today. For more information, phone 1-800-CALL NCR.

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Open, Cooperative Computing. The Strategy For Managing Change.

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COMMENTARY

Christine Comaford

Don't say the D word

If you are preparing to face your staff of seasoned mainframe Cobol programmers and tell them they will now be working on PCs with a variety of new tools, chances are high that you will meet with some resistance. Old pros aren't always thrilled at the opportunity to become young novices again. Change can be very threatening.

But there is hope. Don't tell them that you are downsizing the development department.

Give the following methods a try and see what happens. Your staff may just tell you that they would recommend downsizing.

Find a public relations advocate. This should not be an evangelist but a forward-thinking person who is always looking for new ways to work more efficiently. The person has a "can do" attitude, which is sometimes scorned behind his back, and the enthusiasm and smarts to win out more often than not. For the purpose of this article, let's call this person Bob.

Tell your staff that you've read a few articles on downsizing and you think it's hogwash, but with all of the hoopla, you want to be sure. You've decided to research the viability of a desktop development environment. Bob wandered into your office while you were pondering this and volunteered to check it out for you.

Control the public relations. Bob should act somewhat skeptical, too. He needs to appear sympathetic to the programmers that are more "old school," lest the poor guy has to put up with too much unnecessary grief. He's on your side; take care of him.

Put an intelligent workstation (also known as a PC with a complete software development environment on it) on his desk. Then download some Cobol mainframe programs that he is working on, or have him start writing new programs on his downsized environment. The latter option is preferable since it's far less complicated. Everyone will be watching, so take the necessary time to find the tools most appropriate for your environment.

Now the fun begins. Bob should begin to mention casually that his compiles now take one-tenth (or whatever fraction is accurate) of the time they used to and how neat it is to have source-level debuggers where he can interrupt program execution to check variable values. His increased productivity will be further dramatized if he is able to deliver programs ahead of the mainframe development schedule (without working nights and weekends).

Be diplomatic. Gradually, you'll notice that a few programmers are innocuously glancing at Bob's monitor when they walk by his office. Soon some people will actually watch Bob code. Don't mention that you saw them. You have to let them remain outwardly skeptical so they can save face.

Next, they'll start comparing the environments. They'll ask Bob how long it takes to make and test code changes. They'll be skeptical about various benefits, which Bob should casually offer to demonstrate, "just in case he's misunderstanding what they are asking."

> OLD PROS AREN'T always thrilled at the opportunity to become young novices again.

In a few more weeks, one or more programmers will ask if they can also have a PC like Bob's, just to be sure that their utmost concerns are being addressed.

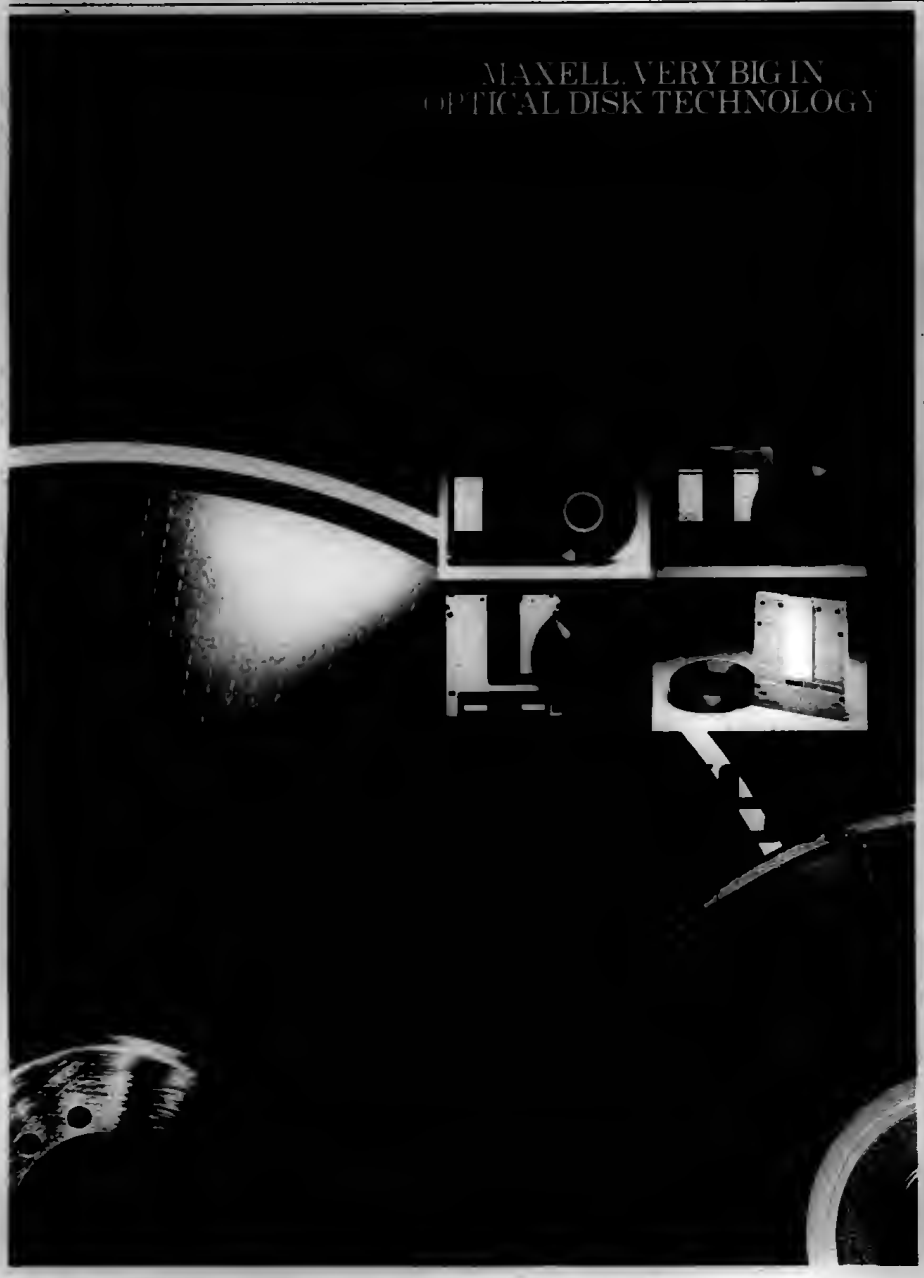
Don't rush it. Remember, the theme is to promote downsizing in a nonthreatening way by simply demonstrating the benefits and letting people determine whether those benefits are attractive. Programmers are generally logical people. If using an intelligent workstation will enable them to write better code in less time, they'll probably go for it.

But give them time. Some people will resist to the last moment. Some people will be just too set in their ways, and they will refuse to give up their dumb terminal, TSO, low job-execution priority and CICS coming to its knees. These folks are the exception.

Orchestrate the migration. Although the above techniques can be very successful, remember that downsizing is no panacea. You may have to rely on a number of new vendors, with tools that do not necessarily work together smoothly. You may undergo some hassles as a result, but as long as your expectations are set properly, you should be able to realize significant return on investment within an impressive period of time.

Downsize in stages and learn from Bob's experiences. You may be pleasantly surprised.

Comaford is president of Corporate Computing, Inc., a Sausalito, Calif.-based downsizing and client/server consulting firm.



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CALENDAR

Cause, the association for the management of information technology in higher education, will celebrate its 20th year of existence at the Cause '91 conference to be held Dec. 3-6 at the Disneyland Hotel in Anaheim, Calif.

Featured speakers include former IBM executive F. G. "Buck" Rodgers and Educom Vice President Michael Roberts, Cause's first president in 1971. The conference will include 48 presentations in eight management and technology tracks.

For more information or to register, contact Cause in Boulder, Colo., at (303) 449-4430.

NOV 10-16

Managing Apple Computers in Information Systems. Phoenix, Nov. 10-13 — Contact: Managing Apple Computers in Information Systems, Chicago, Ill. (312) 644-6610.

Share 77.5. Pittsburgh, Nov. 10-13 — Contact: Share headquarters, Chicago, Ill. (312) 644-6610.

The East-West High-Tech Forum. Warsaw, Nov. 10-13 — Contact: Edventure Holdings, Inc., New York, N.Y. (212) 832-1720.

American Institute of Certified Public Accountants (AICPA) Software Users' Conference. Orlando, Fla., Nov. 11-13 — Contact: AICPA, New York, N.Y. (212) 575-6300.

Cale Expo '91. Phoenix, Nov 11-14 — Contact: National Security Association, Washington, D.C. (202) 775-1440.

The 18th Annual Computer Security Conference. Miami, Nov. 11-13 — Contact: Philip Chapnick, Computer Security Institute, San Francisco, Calif. (415) 905-2267.

North American Telecommunications Association Unicom '91. Washington, D.C., Nov. 11-14 — Contact: Allan M. Olbur, Comserv, Inc., Glenview, Ill. (708) 657-9000.

Windows. Boston, Nov. 11-15 — Contact: The Wang Institute of Boston University, Tyngsboro, Mass. (508) 649-9731.

Datapro Unix & Open Systems Conference. Brussels, Nov. 12-13 — Contact: Rosemary White, Datapro/20, Berkshire, England (011-44) 628 773277.

Autofact '91. Chicago, Nov. 12-14 — Contact: The Society of Manufacturing Engineers, Dearborn, Mich. (313) 271-0777.

Mid-Atlantic Storage Management Association (MASMA) Fall Forum. Philadelphia, Nov. 13 — Contact: Paul Dutka, MASMA, Manville, N.J. (201) 896-7389.

Self Maintenance '91. Boston, Nov. 13-15 — Contact: Rebecca Quinlan, United Publications, Yarmouth, Maine (207) 846-0600.

Northeast Computer Show. Boston, Nov. 13-15 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

LAN/WAN Support Forum. Washington, D.C., Nov. 13-15 — Contact: Help Desk Institute, Colorado Springs, Colo. (719) 531-5138.

Image Compression Conference. San Jose, Calif., Nov. 14-15 — Contact: BIS Strategic Decisions, Woburn, Mass. (617) 893-9130.

The X Window Systems Forum. Boston, Nov. 14-15 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Cyber Arts. Pasadena, Calif., Nov. 14-17 — Contact: Cyber Arts, Cupertino, Calif. (408) 446-1105.

PC Expo. Chicago, Nov. 16-17 — Contact: Annie Z. Scully, Bruno Blenheim, Inc., Englewood Cliffs, N.J. (201) 569-8542.

NOV. 17-23

The New Tools Conference. New York, Nov. 17-20 — Contact: The Center for Computer Graphics for Design, Briarcliff Manor, N.Y. (914) 741-2850.

Guide 81. New Orleans, Nov. 17-22 — Contact: Guide, Chicago, Ill. (312) 644-6610.

Multimedia Expo. San Jose, Calif., Nov. 18-20 — Contact: American Expositions, Inc., New York, N.Y. (212) 226-4141.

Sapphire '91. New Orleans, Nov. 18-20 — Contact: Systems Applications and Products, Lester, Pa. (215) 521-4500.

USA/East Africa Expo '91. Nairobi, Kenya, Nov. 18-20 — Contact: World Access Corp., Wellesley Hills, Mass. (617) 235-8095.

DEMA'S 15th Anniversary Conference & Exposition. Dallas, Nov. 18-20 — Contact: Data Entry Management Association, Norwalk, Conn. (203) 846-3777.

C++ At Work. Santa Clara, Calif., Nov. 18-22 — Contact: Wang Institute of Boston University, Boston, Mass. (508) 649-9731.

Mapping the Future of Computing and Communications. San Francisco, Nov. 19-20 — Contact: Lucy Kehoe, Northeast Consulting Resources, Boston, Mass. (617) 859-0859.

Wescon '91. San Francisco, Nov. 19-21 — Contact: Electronic Conventions Management, Los Angeles, Calif. (213) 215-3976.

User Alliance for Open Systems Meeting. Reston, Va., Nov. 20-21 — Contact: Ed Albrigo, Corporation for Open Systems, Reston, Va. (703) 883-2700.

The 2nd Usenix Mach Symposium. Monterey, Calif., Nov. 20-22 — Contact: Usenix Conference Office, El Toro, Calif. (714) 588-8649.

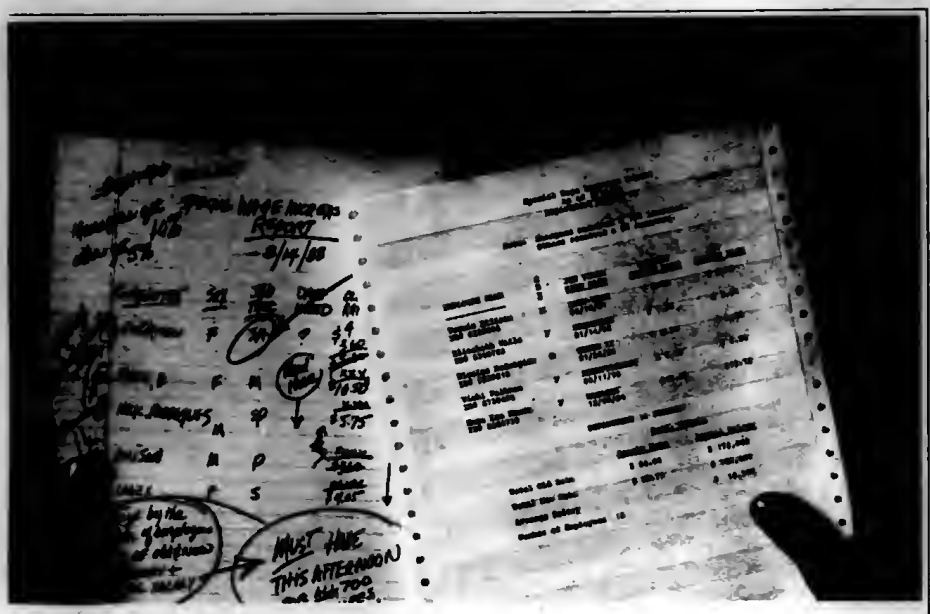
Computer Publishing. New York, Nov. 22-24 — Contact: Joan Barnett, CMC, Norwalk, Conn., (203) 853-0500.

NOV 24-30

Advanced Manufacturing Research's 5th Annual Executive Conference. Cambridge, Mass., Nov. 25-26 — Contact: Advanced Manufacturing Research, Cambridge, Mass. (617) 621-1700.

Esprit Conference. Brussels, Nov. 25-29 — Contact: Esprit Conference Secretariat Commission of the European Communities, Brussels, Belgium. (32 2) 2363103.

European Multimedia Computing Exhibition, Jaarbeurs, Utrecht, The Netherlands, Nov. 28-29 — Contact: Interactive Learning Services Ltd., Den Haag, The Netherlands. 31 (0) 70 35 60 666.



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LAN

A LAN is a combination of hardware, software, and cables which connect or "network" two or more computers within a localized area. The LAN makes distributed processing possible. It allows users to communicate and share applications, data and peripherals.

File Server:

A high-speed computer that functions as the central repository of data and/or application programs for the network. The file server:
- manages the network centrally
- processes communications
- controls user access
- shares printers

Disk Subsystem:

Increases the file server's storage space. Provides performance and reliability that make remote resources appear local.

Workstation:

A user's desktop computing system that can be used for running applications, crunching numbers, etc..

Network Interface Card:

A network interface card is inserted into every workstation on the LAN and the file server. Its main task is to form data packets, transmit them onto the network and receive them from the network.

Transmission Media:

Connect all LAN devices and carry all the data packets to and from the file server. Common media are coaxial cable, twisted-pair cable, fiber-optic and wireless.

Network Operating System (NOS):

Resides on the file server and controls virtually all the activity on the network. It manages connections and resources among LAN devices.

Workstation Operating System:

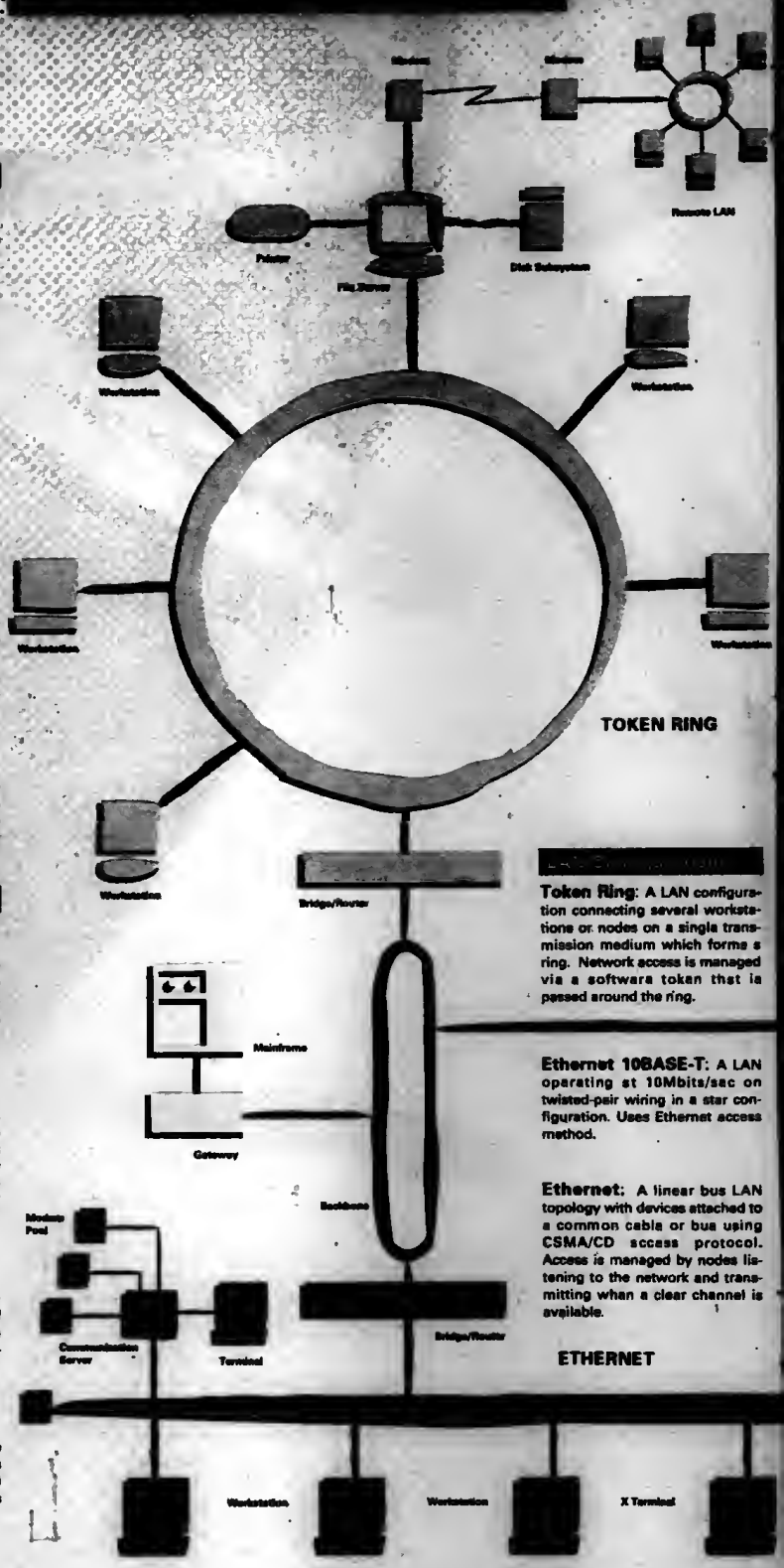
Software (e.g., DOS, UNIX, OS/2, MAC OS) that allows workstation to run applications. Open systems standards such as MIT's X Window protocol allow simultaneous access between different vendors' hardware and operating systems.

Network Management Software:

Provides analysis of network performance, diagnosis of abnormal network operation, configuration information, inventory management and network security.

Network Enhancement Software:

Allows resources attached to the file server or local workstations to be shared and accessed by all network users. Also enhances user-network interface.



Token Ring: A LAN configuration connecting several workstations or nodes on a single transmission medium which forms a ring. Network access is managed via a software token that is passed around the ring.

Ethernet 10BASE-T: A LAN operating at 10Mbits/sec on twisted-pair wiring in a star configuration. Uses Ethernet access method.

Ethernet: A linear bus LAN topology with devices attached to a common cable or bus using CSMA/CD access protocol. Access is managed by nodes listening to the network and transmitting when a clear channel is available.

A LAN can communicate with other LANs and computing resources. Components that extend a LAN and create internetwork communication include:

Backbone: A common, high-speed medium (e.g., fiber optic) that links several LANs or computers.

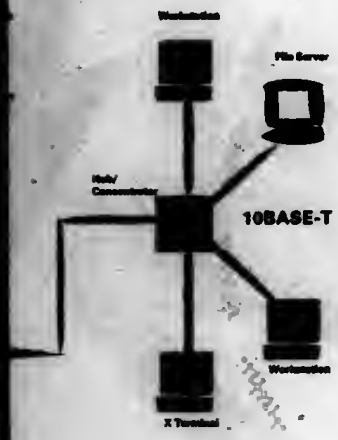
Bridge: A computer or other device which connects two or more LANs.

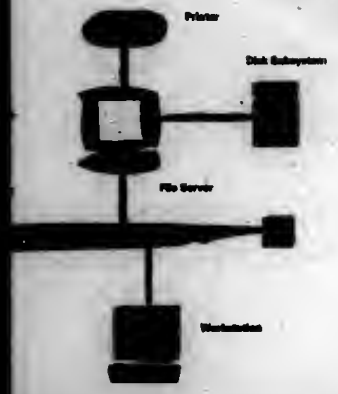
Gateway: Allows users on a LAN to communicate with other systems, such as a minicomputer or mainframe.

Router: Used to route messages through several connected LANs or on a Wide Area Network.

Communication Server: Connects multiple serial devices (modem pools, printers, PCs and terminals) to a network.

Smart Hub: A central wiring device that allows many networking devices to share a network interface connection. Intelligent concentrators provide additional network management and control capabilities.





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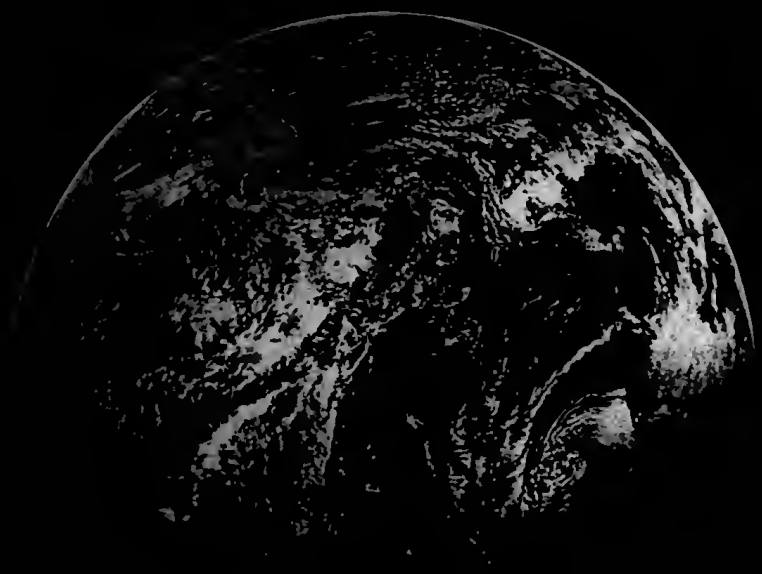

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PC gear for ultra users

PC developments — plus an impressive array of add-ons — are giving users the means to handle almost any kind of job, even when on the go

BY JEREMIAH CARON

There has never been a better time to be a demanding personal computer user. Whether you're looking for speed, memory, mobility, number-crunching or graphics capabilities, there is almost certainly some device either on the market now or on its way that will take you closer to your elusive ideal.

Shopping for the PC power tools of the '90s can be expensive. Innovation always comes with a premium. However, with plummeting PC prices, it is easier than ever to strike a deal on the base machine. Even on peripherals, technology innovations are overlapping one another with such regularity that what is perceived one day as exotic becomes commonplace the next.

The most striking advances today are the ones you can take with you — on laptops, notebooks and palmtops. While palmtops are the most miniature advance in the portables market, it is the notebook market — especially notebooks of the 20-MHz Intel Corp. 80386SX variety — that has taken off and is now the darling of the power user set.

Whole new show

The average notebook PC weighs less than seven pounds with an 8- by 11-in. form factor. Inside this minute package, you can expect 1M or 2M bytes of random-access memory, expandable to 8M bytes or more, an IBM Video Graphics Array-compatible LCD and often a 60M-byte hard disk drive accompanied by a diskette drive, all running for two to three hours on battery power. It can also support Microsoft Corp.'s Windows 3.0 and all but the most demanding applications.

Caron is the senior group editor for the microcomputer-related services provided by Faulkner Information Services, Inc. in Pennsauken, N.J.

Although a configuration this robust was unavailable even a year ago, the stage is set for a whole new show of power. A number of vendors say they'll be shipping I486-based notebooks. Toshiba America Information Systems, Inc. has a 7½-pound machine based on the 486SX chip, and Advanced Logic Research, Inc. says it will offer two 486-based notebooks, each weighing seven pounds. Both are scheduled to ship in December.

Steve Musgrave

Higher capacity drives of 100M bytes or more are expected from market leaders such as Compaq Computer Corp., NEC Corp. and Toshiba within the coming year.

Internal optical drives for notebook PCs will not be prevalent in such a short time frame, but they are already available in heavier, so-called luggable machines.

For the few users who absolutely must have compact disc/read-only memory while away, there is the hefty, 18-pound Grid Systems Corp. machine that includes an internal CD-ROM drive, and, if you don't mind carrying extra equipment, there's a portable CD-ROM drive available from Toshiba.

Another recent innovation that is now commonly offered in notebook computers is the internal fax/data modem, which has truly come of age in the past year, both on and off the desktop. Many notebook PC makers, including Compaq, Grid, NEC, Zenith Data Systems and Toshiba, now include this option in their machines for about $400.

Combination fax/data modem capabilities can now be inexpensively implemented via boards from a wide variety of vendors (see story page 114).

Pricing, even for highly rated, full-featured desktop PC add-in products such as the Intel Satisfaxtion board, is relatively low; expect to pay less than $500.

Attracting attention

Another communications innovation for notebooks is the continuing development and improvement of wireless equipment, including cellular modems. The potential of this technology is tremendous for portable computer users, who ordinarily must find an available telephone jack to send data back to the office, which is not always convenient.

Cellular capability is not a widespread option, but vendors are taking notice (see story page 107).

On AT&T's Safari NSX/20 notebook, for example, a fax/data modem can be upgraded for wireless communications. IBM offers a specialized portable system that can be equipped to communicate with a host computer via radio waves, and Toshiba is now delivering a laptop package that consists of a computer and a cellular phone. For any of these systems, however, users must be willing to pay the piper, to the tune of $5,000 or more.

Even features that were never before available on notebooks are starting to be announced, including color, although most observers say the quality isn't high. Epson America, Inc. offers a color notebook, while AST Research, Inc. and Sharp Corp. say they will ship color models before the end of the year.

Meanwhile, back at the office, users of desktop PCs have graphics displays at their beck

Continued on page 102

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Boards Galore
Want it? You can pretty much have it, with boards. Pages 102, 103.

Palmtop Power
Palmtops take on business functions, page 108. Product listing, page 111.

Buyers' Scorecard
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PC gear

FROM PAGE 101

and call. For most business users, the 16-bit enhanced VGA display and adapter offered on many high-end PCs is fine for handling multiple applications under the Windows environment and business presentation graphics software package.

For the segment of the power user community that is heavily involved with graphics — engineers, architects, graphic artists, desktop publishers and professionals involved in imaging or multimedia applications — other display alternatives are absolute necessities.

Luckily for them, the market does not lack high-resolution graphics adapters of 1,024 by 768 pixels and higher as well as large-screen display options of 16 and more diagonal inches.

Mature market

Super VGA and more specialized graphics adapters from systems and third-party vendors alike that include some sort of graphics coprocessor and a complement of video-specific RAM usually fall in the $800 to $2,500 price range.

ATI Technologies, Inc., Boca Research, Inc. and others, for example, offer graphics adapters that support 256,000 colors and 1,024- by 768-pixel resolution for about $1,000. High-resolution, large-screen monochrome and color monitors from vendors such as NEC, Wyse Technology, Inc. and Taxan USA often fall in a similar price range.

People running graphics and other heavy-duty applications will also be happy to know about the storage innovations appearing on PCs, in both magnetic and optical drives. Most power users require at least 300M bytes on their hard drive, and there are plenty of ways to go about getting such capacity (see story page 115).

Optical drives are becoming increasingly more practical from both a function and a price perspective, although it will be some time before they are low enough in price and high enough in performance to appeal on a large scale. However, they could come in handy for users who need to run graphics-intensive applications or one of the emerging desktop-based imaging software packages.

Heavy-duty applications demand not only lots of storage but also extra chips, namely those of the number-crunching variety. Numeric coprocessors are essential for graphics, large spreadsheets and other compute-intensive applications.

If you're already using a machine based on Intel's i486 CPU, you're already equipped with an integrated math coprocessor. If not, don't despair: Intel sells mathematical coprocessors, as do Weitek and three relatively new competitors: Chips & Technologies, Inc., Cyrix, Inc. and Advanced Micro Devices, Inc.,

Although the new players have yet to make much of an impact on the market, they are expected to drive down pricing. Currently, a math coprocessor ranges from about $500 at the low end to as much as $2,000 at the high end.

Buy upgradable

If you already know you're going to need more CPU power than you can afford at the moment, the best deal going is the relatively new class of upgradable PCs. These modular machines allow users to swap out essential processor-related components for more powerful alternatives as required.

Modular PCs are available from vendors at all points of the pricing spectrum, including IBM, Compaq, AST Research, Dell Computer Corp., Wyse and Advanced Logic Research, to name just a few (see story page 106).

Even if you're stuck with your current system and are craving a power boost, there are plenty of add-in boards to consider. CPU speed? You've got it, all the way up to the 486 limit, available in both add-in boards and processor replacements from Aox, Inc., Intel and Microway, Inc. These can be purchased in the neighborhood of $1,000.

There is seemingly no end to the capabilities you can add to your PC through the use of boards. There are I/O accelerator boards such as IBM's PS/2 Wizard Adapter, which sells for $6,500; full-motion video boards such as IBM's M-Motion Video Adapter, which sells for $2,250; and audio capture and playback adapters, which sell for approximately $500.

There are even boards that can turn your PC into a voice mail system. All you need is a PC with a 386SX processor or above, at least 1M to 2M bytes of hard disk space for each mailbox and $400 for the software. You can even operate the voice mail system in background mode while you run other applications.

Some PC-based voice mail systems, such as The Complete Communicator from The Complete PC, also provide built-in data/fax modems that allow the user to send and receive faxes and communicate with another PC or host system.

With all of the things you can do today from a single machine, there will only be more the next time you look.

There are drawbacks to scooping up technology as soon as it's announced: Some advances appear before they're fully mature, and others demand a high asking price. But with product cycles as short as they are today, it's only a matter of time before the cutting edge becomes time-tested. •

Upgradable Intel I486-based system; 50-MHz clock speed; 8M-byte RAM; 3.5-in., 1.44M-byte disk drive; SCSI 330M-byte hard disk drive; enhanced VGA graphics and color VGA monitor; keyboard and mouse; system software	$11,200
Data/fax modem board	$450
Voice mail hardware/software	$400
SCSI CD-ROM drive	$600
250M-byte tape backup drive	$800
Total	$13,450

Five-pound Intel 80386SX-based system; 20-MHz clock speed; 4M-byte RAM; 3.5-in., 1.44M-byte disk drive; SCSI 60M-byte hard disk drive; internal battery; numeric keypad; system software, including Windows	$4,200
Internal data/fax modem	$500
Math coprocessor	$700
Extra battery pack	$150
Total	$5,550

Intel I486-based system; 50-MHz clock speed; 8M-byte RAM; 3.5-in., 1.44M-byte disk drive; SCSI 650M-byte hard disk drive; keyboard and mouse; system software	$12,400
High-resolution graphics controller with 256K-byte VRAM and graphics coprocessor	$1,300
High-resolution, 19-in. color monitor	$1,100
SCSI rewriteable optical disc drive	$3,000
Image scanner	$1,500
Total	$19,300

Source: Faulkner Technical Reports

CW Charts: Marie Hames

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A Toshiba laptop in the hands of a professor of economics in Bulgaria helps him teach Western economics with a spreadsheet. An IBM Portable PC in Czechoslovakia helps teach business plan writing skills to young entrepreneurs. Desktop computers at 30 Institutes of Security Studies across Europe keep communication open to prevent war. A traveling laptop collects ecological data from the Aral Lake in Kazakstan. Donated modems let schools join a worldwide program for intercultural understandings. NEC laptops with modems teach journalism students how to operate as traveling reporters in Russia.

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PC memory boards (16M bytes and higher)

VENDOR	PRODUCT	HARDWARE PLATFORM	MEMORY RANGE (BYTES)	READ ACCESS TIME (NSEC)[1]	BUS TYPE	BUS SIZE	MODULE SIZE (BYTES)	CHIP SPEED (NSEC)[2]	MEMORY CONFIGURATION[3]	EXPANDED MEMORY STANDARD	SYSTEM UTILITIES	WARRANTY	PRICE	PRICE PER MEGABYTE FOR ADDITIONAL MEMORY
Aerologic, Inc. (714) 454-2441 (800) 234-7811	RAMPAT	IBM AT, XT, 286-, 386-, 486-based compatibles	0M - 16M	80	ISA	16-bit	1M, 4M	80	SIMM	Extended memory, EMS 4.0	Installation software, print spooler, RAM disk, disk cache	Five-year, parts and labor	$199 w/o memory, $395 with 4M	$60
All Computers, Inc. (416) 960-0111	All Supercharge Models F1, F2, M1, M2	IBM PCs and compatibles	0.5M - 32M	60	ISA, EISA, MCA	8- 16-, 32-bit	.5M, 1M, 2M, 4M, 8M, 16M	80	Modular card 2-in. by 3-in., 1.5-in. by 2-in.	Extended memory, enhanced EMS, FMS 4.0, provides all forms of memory from dynamic pool	Memory manager	One-year	$400 with 2M, $649 for F1, F2 with 4M, $1,200 for M1 w/o memory or with 16M	$75
Boca Research, Inc. (407) 997-6227	BOCARAM. MCA 32	IBM PS/2, MCA systems and compatibles	4M - 32M	200	MCA	32-bit	1M, 4M	100+	SIMM	Extended memory EMS 4.0 emulation	Installation software, diagnostics	Five-year	$295 w/o memory, $605 with 4M, $1,095 with 8M, $1,995 with 16M, $3,500 with 32M	NA
C. E. Infosys USA (703) 435-3800 (800) 323-3462	Magaram	IBM PS/2, MCA systems and compatibles	0M - 32M	100+	MCA	8-, 16-, 32-bit, board is ex-bensetly a 32-bit board with 32-bit processing	1M, 4M	100+	SIMM	Extended memory	Installation software	Lifetime on board, five years on SIMM module	$349 retail, $192 reseller	$129 retail, $70 reseller
	Ramflex Plus/ Ramflex Plus PS	ISA compatibles and clones	0M - 32M	100 or faster SIMMs	ISA	8-, 16-bit	1M, 4M	100+	SIMM	Extended memory, enhanced EMS, EMS 4.0, EMS 3.2	Installation software	Lifetime on board, five years on SIMM module	Ramflex Plus $496 retail, $272 reseller; Ramflex Plus PS $545 retail, $300 reseller	$129 retail, $70 reseller
Dayster Digital, Inc. (404) 967-2077 (800) 962-2077	RAM Powercard	Any Macintosh with Nubus	0M - 256M	1 (wait state)	Apple Macintosh (Nubus)	32-bit	1M, 4M, 16M	80 or 100	SIMM	None	RAM disk, diagnostics	12-month, 30-day money-back guarantee	$879 w/o memory	NA
Kingston Technology Corp. (714) 435-2600	KTM 3077-2	MCA systems	2M - 16M	80	MCA	32-bit	1M, 2M, 4M	80	SIMM	EMS 4.0	Installation software, uses system diagnostics	Five-year	$975 with 2M	$250
	KTM 609/16-2	MCA systems	2M - 16M	80	MCA	16-bit	1M, 2M, 4M	80	SIMM, IBM-type 256 x 36, 512 x 36, 1M x 36	EMS 4.0	Installation software, uses system diagnostics	Five-year	$905 with 2M	$250
	ATaboard	ISA systems (AT bus)	2M - 16M	80	ISA, EISA	16-bit	1M, 4M	80	SIMM	EMS 4.0	Installation software	Five-year	$395 with 2M	$250
Micro Memory, Inc. (818) 998-0070	Dynamic Memory, nonvolatile CMOS memory module	ISA, EISA systems	1M - 128M	75	ISA, EISA, VME	16-, 32-, 64-bit	1M, 4M	85	DIP, ZIP, SOJ, SIP	Extended memory, EMS 4.0, RAM disks for CMOS with battery backup up to 16M-byte single slot	RAM disk	Lifetime dynamic memory, one-year CMOS	Contact vendor	Contact vendor
Newer Technology (316) 665-4904 (800) 678-3726	Concentration	IBM PC AT, 386, 486	0M - 32M	80	ISA, EISA	16-bit	256K, 1M	80	SIMM	EMS 4.0	Installation software, RAM disk, diagnostics	Five-year	$325 w/o memory, $495 with 2M, $665 with 4M, $1,010 with 8M, $1,690 with 16M	NA
Orchid Technology ($10) 683-0300	Ramquest 16/32	IBM PS/2 Models 80, 50Z, 55SX, 60, 70, 80, MCA systems and compatibles from Bull, Olivetti, Apricot	0M - 32M	80	ISA	8-, 16-bit	256K, 1M	80	SIMM	Extended memory, EMS 4.0	Installation software, print spooler, RAM disk, disk cache	Four-year	$199 w/o memory, $369 with 1M, $449 with 2M, $869 with 4M	NP
STB Systems, Inc. (214) 234-8750	Power Mag	IBM AT	0M - 32M	187	ISA	16-bit	256K, 1M, 4M	70 - 120	SIMM	EMS 4.0	Installation software, diagnostics	Two-year	$289 w/o memory	NA
Tecmar, Inc. (216) 349-0600	CleanRAM	8-, 16-bit ISA systems	512K - 32M	MCA spec for 0 wait state	ISA	8-, 16-bit (automatically adjusts to system)	256K, 1M, 4M	70 - 120	SIMM	Extended memory, enhanced EMS, EMS 4.0, EMS 3.2	Installation software, print spooler, RAM disk, diagnostics, utility to map out bad blocks in 64K increments	Two-year, 48-hour repair during first six months	$320 w/o memory	$100
	MicroRAM SC (IBM, SIMM compatible)	MCA 16-, 32-bit systems	1M - 32M	MCA spec for 0 wait state	MCA	16-, 32-bit (automatically adjusts to system)	1M, 2M, 4M, 8M	70 - 100	SIMM	Extended memory	Installation software, print spooler, RAM disk, diagnostics	Two-year, 48-hour repair during first six months	$389 w/o memory	$100
	MicroRAM 386	MCA 32-bit systems	1M - 32M	MCA spec for 0 wait state	MCA	32-bit	256K, 1M, 4M	70 - 100	SIMM	Extended memory	Installation software, print spooler, RAM disk, diagnostics, utility to map out bad blocks in 64K increments	Two-year, 48-hour repair during first six months	$450 w/o memory	$100
	MicroRAM AD (advanced design)	IBM PCs, MCA 16-bit systems	512K - 32M	MCA spec for 0 wait state	MCA	16-bit	256K, 1M, 4M	70 - 100	SIMM	Extended memory, enhanced EMS, EMS 4.0, EMS 3.2	Installation software, print spooler, RAM disk, diagnostics, utility to map out bad blocks in 64K increments	Two-year, 48-hour repair during first six months	$330 w/o memory	$100
Xtend Micro Products, Inc. (714) 753-0220	RAMXtender MC-32	IBM PS/2 Models 70 and 80	0M - 16M	MCA spec	MCA	32-bit	256K	85+	SIMM	Extended memory, EMS 4.0	Installation software, diagnostics, memory manager	Five-year	$450 with 2M, $630 with 4M	$50
	RAMXtender MC-16	IBM PS/2 Models 50 56SX, 60, 65SX	0M - 16M	85 or faster	MCA	16-bit	1M, 2M, 4M	80	SIMM	Extended memory, EMS 4.0	Installation software, diagnostics, EMS driver, memory manager	Five-year	$450 with 2M, $630 with 4M	$50
	32 Megabyte Module	Compaq Deskpro 386/33L, 486/33L, Systempro	0M - 32M	70	Compaq proprietary	32-bit	4M	70	Proprietary module	Extended memory, EMS 4.0	None	Five-year	$4,795 with 32M	$55

[1]The time from when the processor or other device makes a request for data at a given address to the time the memory board responds that it is ready to send data.

[2]The time it takes the processor to access memory.

[3]Single In-Line Memory Module (SIMM) is a type of memory expansion involving individual memory chips socketed to panels that are inserted into expansion cards. DIP stands for Dual In-Line Package.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Contact vendor for further product information.

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*Source: *Computerworld* article, February 1991

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Upgradables multiply as users, vendors see their versatility

BY DEBORAH ASBRAND

1991 may be remembered as the year of the upgradable personal computer, a machine that promises to make processor switching as easy as changing your clothes.

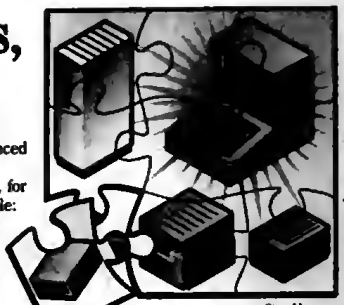
Just this year, an abundance of vendors — including Acer America Corp., Arche Technologies, Inc., Compaq Computer Corp., Dell Computer Corp., Hyundai Electronics America, IBM, NEC Corp., Northgate Computer Systems, Inc. and Tandon Corp. — have entered this market, which for several years was occupied by only a handful of vendors, including AST Research, Inc. and Advanced Logic Research, Inc.

Asbrand is a free-lance writer based in Boston.

What's the big rush? The answer, for vendors and purchasers alike, is simple: economics. For vendors, the modular machines are a lot less expensive to manufacture than a complete new system. The proprietary boards can also lock users into a vendor's technology [CW, Oct. 14].

But for users who have purchased them, the prospect of replacing a board when it comes time to upgrade is preferable to purchasing a whole new system.

Few people have actually upgraded one of these machines, but one user who has — Tim Mihalik, a senior network analyst at The Home Insurance Co. — estimates cost savings of 25% to 30% as he begins to replace the Intel Corp. 80386SX processors in 16 of the firm's 600 AST Premium PCs. Instead of paying AST's $2,795 base price for new 33-MHz, 386-based systems, Mihalik purchased 16 upgrade cards at $1,545 each.



Steve Musgrave

Replacement boards on the average sell at 50% to 70% of the price of a complete system, and prices are dropping fast. Shortly after Compaq introduced its Desktop M series, ALR slashed prices on its I486 upgrade cards by 10% to 50%.

Not only are the cards less expensive, but prices on the upgradable PCs are also competitive. Compaq's Desktop M 486/33 model has a base price of $4,799, while the starting price for AST's comparable machine is $4,495. Tandon's Option sells for $3,735, with an 80M-byte hard drive and a monochrome monitor.

Second only to cost savings is the convenience of these upgradable models. If you've ever installed one of the more traditional motherboards, you know what a time-consuming procedure it can be.

Most of the replaceable CPUs are on cards that slip in and out of the PC in what users say is a matter of minutes. "It took longer to take the screws out of the box than it did to pop in the board," says Mihalik, who has replaced the CPUs in more than a dozen AST machines.

Equally important, no further system adjustments need be made once the new processor is in place. The PC reads the new processor's architecture and self-adjusts accordingly.

So simple is the procedure that some businesses rotate their supply of 486 boards according to users' needs, installing them when projects demand extra computing power and then reinstalling the lower level processors when the projects end.

"We use 386SX 16-MHz CPUs, but every now and again, we have a loan officer doing number-crunching analyses," explains Paul Bryant, systems administrator at the Los Angeles office of the Industrial Bank of Japan. "We pop the lid on his computer, pull out the 386SX, pop in the board and quadruple the power of the computer. Without disturbing the computer or the user's working environment, the PC now operates four times faster."

Each manufacturer is taking pains to emphasize design innovations that make its PC easier to upgrade than the competition's.

On Compaq's Desktop M series, the cover is attached with hinges instead of screws, eliminating the need for a screwdriver during the upgrade process. Tandon's Option series goes one step further, allowing users to upgrade without removing the case. Its CPU cartridge resembles a videocassette and is inserted in a slot in the computer's front panel.

Acer America sidesteps the proprietary card requirement entirely. Its Acerpower 486SX/20 accepts commercial 25- or 33-MHz 486 chips.

More vendors are expected to convert their PC lines to upgradable models. In fact, vendors such as Acer America and ALR will soon be offering upgradable laptops. According to an Acer press release, the Aceranyware W486 will be based on the 20-MHz 486SX processor and can be upgraded to a 25-MHz 486DX. ●

Sampling of upgradable PCs

Company	RAM	Storage	Price
AST Research			
Premium 386SX/16	2M bytes	40M bytes	$2,095
Premium II 386SX/20	4M bytes	80M bytes	$2,095
Premium II 386/33	4M bytes	80M bytes	$3,295
Premium II 486SX/20	4M bytes	80M bytes	$3,495
Upgrade cards: $1,545 (386/33); $1,595 (486SX/20); $2,595 (486/33).			
Acer America			
Acerpower 386SX	2M bytes	40M bytes	$2,700
Acerpower 486SX/20	2M bytes	120M bytes	$2,995
Uses commercial chips rather than proprietary cards. $499 is current market price for chips.			
Advanced Logic Research			
Powerflex 286/12.5	1M byte	80M bytes	$1,495
Powerflex 386SX/16	1M byte	80M bytes	$1,695
Powerflex 386SX/20	1M byte	80M bytes	$1,895
Powerflex 486SX/16	1M byte	80M bytes	$3,195
Upgrade cards: $245 (386SX/16) — $2,495 (486/50). Six cards available in product line.			
Dell Computer Corp.			
Powerline 420DE (486SX/20)	4M bytes	80M bytes	$3,000
Powerline 425DE (486/25)	4M bytes	80M bytes	$3,300
Powerline 433DE (486/33)	4M bytes	80M bytes	$4,300
Upgrade cards: $2,599 (486/33); $3,299 (486/50).			
Hyundai Electronics			
Corporate Series 386/40	4M bytes	100M bytes	$3,295
Corporate Series 486SX/20	4M bytes	100M bytes	$3,495
Corporate Series 486/33	4M bytes	100M bytes	$4,895
Upgrade cards: $1,695 (486/33); $1,215 (486SX/20).			

This listing is intended to show selection variety and is not indicative of market share

CW Chart: Marie Haines

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BIMSPLSR — Optional laser printer support for BIMSPOOL.

BIMSPOON — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.

BIMSPLIT — May be used separately or with BIMSPOOL to print parts of an existing job to terminal printers at separate sites.

BIM-PDQ — POWER Dynamic Queuing performance enhancement. Eliminates 85% of the I/O to heavily used POWER queue.

BIM-PADS — Automatically alters or deletes DOS POWER spooled job entries at preset intervals.

BIM-ODIS — Comprehensive problem analysis and display of operational CICS system. ODISTRAK is an optional historical reporting feature to be used with BIM-ODIS to generate reports relating to system usage. DOS and OS.

BIM-BUFF — Significantly increases the performance of VSAM under DOS by dynamically managing VSAM buffers.

BIM-PACK — Automatically compresses selected VSAM files transparent to applications and and users under DOS.

BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input. DOS and OS.

BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.

BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. DOS and OS.

BIM-PMAP — CICS BMS on-line map generation and maintenance. DOS and OS.

BIMECHO — Copies one CRT's output to another or printer for problem determination and demonstration. DOS and OS.

BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer. DOS and OS.

BIMDIRY — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.

BIMCNSOL — Multiple/Remote System Console function for CICS. Display-only or full input/display versions available.

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When you can't wait for a phone

BY CRAIG BOBCHIN

Ninety percent of the time, you can probably wait until you're at an office or hotel room to dial up to the home office or electronic mail system from your portable computer. But life is seldom convenient — what if you need immediate access to the database and there's no phone jack available? That's when cellular equipment comes in handy.

There are essentially three ways to purchase equipment for cellular transmission. If you're starting from scratch, you can buy a kit, complete with laptop, cellular telephone and cellular modem. The basic difference between a cellular and a traditional modem is beefed-up error correction.

One of the better known kits available is the ITCV20PUP from Intelligence Technology Corp., which includes a 386-based laptop and a 2.4K bit/sec. cellular modem, for about $4,500.

Stephens Engineering just released a 28-pound package that includes an Intel Corp. 80386SX-based personal computer, an ink-jet printer, a cellular phone, a fax modem and a data modem. The whole system is priced at just under $10,000.

You can also just purchase a laptop with an internal cellular modem. Toshiba America Information Systems, Inc. manufactures the $349 T24D/X proprietary modem that fits in the modem slot of virtually all of its computers.

Many portable computer vendors rely on third-party internal or pocket-size external modems, which range in price from $300 to $1,000. Two of the more popular modem offerings in this market are from Microcom, Inc. and Telebit Corp.

Toshiba	Microcom	Telebit
T24DX	Microporte 1042	Cellblazer
Base rate: 2,400 bit/sec.	*Base rate:* 9.6K bit/sec.	*Base rate:* 10K bit/sec.
Error correction: MNP 2, 4, V.42	*Error correction:* MNP 2, 4, 10, V.42	*Error correction:* MNP 4, V.42, PEP
Price: $349	*Price:* $649	*Price:* $1,245

This listing is intended to show selection variety and is not indicative of market share

Microcom's Microporte 1042 leads the market in sales, according to Ken Krechmer, a consultant at Action Consulting in Palo Alto, Calif. This external, battery-operated modem includes Adverse Channel Enhancement, which allows the modem to slow transmission speed automatically when a signal becomes too noisy and to speed up when it clears up.

If cost is an issue, Cellabs' Cellmodem 2400 is one of the least expensive cellular modems. Another advantage of the Cellmodem 2400 is that it provides its own interface to the cellular phone. Many modem manufacturers depend on third-party manufacturers to provide interfaces, and the purchaser has to check for compatibility.

The $130 Cellabs interface, called the Datajack, is a "dumb" interface. This essentially means the user has to dial modem calls from his cellular phone'a handset and answer calls the same way.

Smart interfaces, on the other hand, allow your communications package to dial and answer the phone. One example is Axsys, which was co-developed by several manufacturers, including Toshiba, NEC Corp. and Spectrum Cellular Corp. Axsys, which sells for $300 to $400, is compatible with several modems and laptop systems.

Motorola, Inc. also makes a smart interface, although it can only be used with its own cellular phones. Telular, Inc. sells one as well; the only problem is that it needs to be attached to the same power supply as the phone, making it useful only if you're calling from a vehicle.

While cellular communications are the best option today for wireless communications, a lot of organizations may eventually switch to mobile radio networks, which offer less interference and noise with faster operations. •

Bobchin is president of CMB Systems Design, a consulting firm in Fountain Valley, Calif.

Users hungry for more

The past year has seen a lot of action in the personal computer market. Intel Corp. introduced a daunting variety of chips; vendors are clamoring to support the most recent Microsoft Corp. Windows version; Apple Computer, Inc.'a System 7.0 is getting a lot of acclaim; and there'a even a new version of DOS to kick around.

It appears, however, that the power-hungry are still just that: ready for another course. *Computerworld* spoke with a cross-section of 30 self-proclaimed "power users" recently to find out how satisfied they are with what the market has to offer in terms of PC hardware and software. While the phone survey was too small to be statistically valid — we spoke with only 30 individuals — a number of issues did emerge with surprising frequency.

Ironically, two of the most popular purchases this group made in the past year — the Windows operating environment and a variety of laser printers — were also the most highly criticized.

Windows frustrations:

▶"Windows is multimegabytes of slow performance bloat."

▶"It's too slow, and there are too many steps to get where you want to go."

▶"I come from the mainframe environment, and the amount of times Windows freezes the machine is very frustrating."

▶"What I'd like to be able to do is treat each different window in Windows as a separate machine and not have to reboot to run different applications."

Printer frustrations:

▶"You just can't do color printing inexpensively on plain paper for business."

▶"I'm frustrated with the cost per page of laser print output."

▶"I'd like to find a reliable laser printer that'a easy to set up."

Then there are the products that can't be purchased. We asked people to identify areas in which they felt constrained by the limitations of available software and equipment. The overwhelming response was also the most basic of capabilities — more memory.

Many blamed the 640K-byte DOS limitation, while others pointed to "the excessive memory requirements of many software packages."

▶"Software today is pushing against the limits of RAM," one user said.

▶Another came up with a progressive strategy: "I'd like to have an integrated memory management scheme that combines a disk cache and RAM disk."

So what would users do if they had all this memory sitting around? They certainly wouldn't let it rest for long:

▶One respondent speaks for many when he mentions multitasking: "I'd like to be able to run multiple programs that require a lot of RAM."

▶"Build and concurrently run large programs."

▶"Run multiple operating systems simultaneously."

One thing is for sure: The respondents don't see the vendors helping the RAM cram situation, especially when it comes to upgrade policies.

▶"In order to use all the features of some upgrades, you have to add more RAM or get a faster chip," one respondent said.

There were other complaints about upgrades:

▶"Every time you upgrade your operating system, a lot of software won't work with it. Then all the software vendors want to charge you to upgrade their software."

▶"I'd like to have usable software packages with consistently available upgrades that are in sync with hardware technology."

Probably the biggest theme to come out in the survey is the one vendors dread yet talk about the most: the "O" word, as in open systems. Many of the respondents voiced the same desire to switch back and forth between application packages and operating systems and exchange data among diverse hardware and software platforms.

▶"I'd like to perform a comparison of statistical data across different applications packages."

▶"There's a lack of applications packages with completely integrated functions that allow exchange of data between mainframes, minis and PCs."

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Power computing in tight spaces

The latest of these miniature machines offer serious business functions

BY MEL MANDELL

They are miniature, but palmtop computers have moved beyond the league of, say, the prize at the bottom of the cereal box. More memory, a larger variety of data transfer mechanisms, more third-party software support and other new capabilities are now enticing erstwhile notebook and even desktop computer purchasers to choose the more diminutive machine for serious office applications.

At Brooklyn Union Gas Co. in New York, customer service representatives who used to share one $3,000 IBM Personal System/2 Model 50 now each sport a $400 Sharp Electronics, Inc. Wizard palmtop.

The Wizards don't just keep track of appointments and phone lists. Connie Lamicela, an analyst at the gas company who had been using the Wizard for her personal tasks, bought the palmtops with the intention of running an expert system application to guide service reps in dealing with slow-paying customers. Lamicela transferred the application from the PS/2 with a 64K-byte random-access memory card.

HIGHER RAM CAPACITIES have attracted third-party software firms to the market, including palmtop versions of 1-2-3 and Wordperfect.

Higher RAM capacities are an important factor in the burgeoning palmtop market. While 128K bytes come standard on many palmtops, Hewlett-Packard Co.'s 95LX and Poqet Computer Corp.'s Poqet start at 512K and 640K bytes, respectively. Recent announcements of 16M-bit memory chips may quadruple RAM in the next couple of years.

The higher capacities have succeeded in attracting to the palmtop market third-party software firms that offer specialized software for field salespeople, as well as palmtop versions of standard programs.

Poqet boasts a long list of compatible software, including Wordperfect Corp.'s Wordperfect 5.1; Lotus Development Corp.'s 1-2-3 Version 2.2 and Agenda; and Microsoft Corp.'s Works.

HP collaborated with Lotus to include a version of 1-2-3 on its 95LX. The inclusion of 1-2-3 was the clincher for George Overholt, director of credit services at Montgomery Ward in Chicago. Overholt, who needs to consult spreadsheets at business meetings, says he is pleased with how easy it is to download Lotus files to his 512K-byte palmtop.

Memory doesn't come cheap on higher capacity machines — at $699, the 95LX is one of the pricier palmtop offerings, and Poqet is priced even higher, at $1,500.

Very demanding applications may require the purchase of additional memory, which is available in two forms: 128K-byte RAM cards, which Atari Computer Corp. sells on its Portfolios for $200, or accessory 3½-in. floppy disk drives — which are larger than the palmtops they connect to.

New methods of data transfer can also get expensive. The newest capability is wireless, as found on Poqet's just-announced Poqet Communicating Computer. The machine uses the Ardis radio network from IBM and Motorola, Inc. to communicate in real time at a cost of $5,000 and a weight gain of two pounds. That's list price — as with all small computers, such prices

Mandell is a free-lance writer based in New York.

are widely discounted.

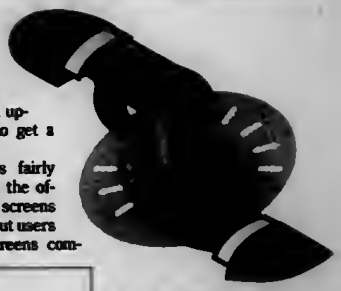
Other methods of data transfer are less expensive. Chigniew Bjalski, vice president and trust officer at a large bank in Dallas, selected Atari's Portfolio for both its ease of data transfer and its low cost — $299.95.

Like many palmtops, the Portfolio uses a cigarette-pack-size interface and a cable that connects to a desktop machine for data transfer or to a printer. The mechanism, called Smart Parallel Interface, costs $50.

Access to electronic mail is another capability that has become important to users on the road. Most people purchase portable modems — such as the Worldport modem, which sells for $350 — for that purpose. Almost all palmtops offer a modem port, except Casio, Inc.'s Boss 9500, which sells for $320.

As palmtops grow in their corporate role, the basic functionalities — screen size, keyboard quality and battery life — become even more important. While people are generally pleased with these attributes, palmtops do require some getting used to.

In terms of screen size and capacity, only the Poqet and the Sharp PC 3000 offer full 80-column, 25-line display: All the other machines require sideways and up-and-down scrolling to get a full reading.



Steve Musgrave

Screen quality is fairly consistent across all the offerings; none of the screens offers backlighting, but users say that today's screens compare favorably with the screens of larger machines.

Poqet also offers the largest keyboard. No palmtop keyboard can allow much more than two- or four-finger typing, and the keys are too small and too close together to type with the same speed and accuracy as on personal computers.

However, the Poqet, while bulkier, comes closest to offering a typewriter-key-like keyboard that is large enough for 10-finger typists to try to exploit their skills.

The good news is that all manufacturers have now switched to QWERTY keyboards, including the latest holdout, Psion, Inc. Wizard took three years to switch to a QWERTY layout and now offers a touch screen as well.

THE KEYS ARE too small and too close together to type with the same speed and accuracy as on personal computers.

Battery life on palmtops ranges from 30 to 80 hours, which can be extended via a $10 AC adapter. Users generally don't complain about battery life, although Overholt notes that the batteries on his 95LX didn't last as long as advertised.

Reliability on these machines is taken for granted at this point, although some users have experienced trouble. Overholt says he experienced multiple crashes on his Portfolio and finally bought a 95LX. "I've used HP calculators for years, and they are very reliable," he says.

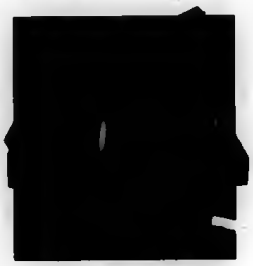
The future is sure to bring even more functionality to these tiny platforms. Intel Corp. recently announced microprocessors that incorporate power management.

There has been talk of smaller hard drives, such as the 1.8-in., 3.35-ounce, 20M- and 40M-byte drives announced by Integral Peripherals, and energy-conserving drives are being sampled by vendors. ●

▶ See a listing of palmtops, page 111.

Meet the Notebook that Breaks the Mold

At just 6.8 pounds, SPARCbook 1 is light enough to carry comfortably and small enough to fit in your briefcase. Yet it incorporates the same power as the world's most popular desktop workstations from Sun Microsystems, including: a SPARC RISC processor sustaining 18 MIPS, 8 to 32 MB of fast DRAM and up to 240 MB of disk space.



Processor	25 MHz SPARC™
DRAM	8 MB or 32 MB
Disk Options	85 MB to 240 MB hard disk; 1.44 MB 3.5" floppy drive
LCD	640 x 480 monochrome resolution; color available Q1'92
Communication	Ethernet and modem with SendFax
Battery Power	Removeable NiCad battery: 4 hours normal operating time
Keyboard	82-keys with integrated MouseKey, 12 function keys
Dimensions	11.8" x 8.5" x 1.9"
Weight	6.8 pounds (with battery)
Bundled Software	Solaris 2.0- SunOS SVR4 operating system, Open Network Computing (ONC),Open Windows V3 and DeskSet Tools; SunOS 4.1 and SunView Binary Compatibility Packages; modem, Ethernet and power management software- 80386 DOS emulation

Now you can run UNIX and DOS applications unmodified— anywhere. SPARCbook comes with Solaris 2.0, SunSoft's UNIX SVR4 implementation, enhanced for battery operation and Insignia Solutions' MS-DOS emulation software.

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Power

Palmtop computers

VENDOR	PRODUCT	COMPATIBLE HARDWARE	WEIGHT[1]	DIMENSIONS (INCHES)	SCREEN SIZE: (LINE x CHARACTER)	NUMBER OF KEYS ON KEYBOARD	SIZE OF KEYBOARD AREA (INCHES)	RAM CAPACITY: MINIMUM/MAXIMUM (IN BYTES)	BATTERY LIFE	NUMBER OF BATTERIES	SPREADSHEET CAPABILITIES	TEXT EDITOR CAPABILITIES	BUILT-IN MODEM	PERSONAL INFORMATION MANAGEMENT CAPABILITIES	FILE TRANSFER SOFTWARE	PRICE
Atari Computer Corp. (408) 745-2000	Portfolio	IBM-compatible peripherals	1 pound	4 x 7.75 x 1	6 x 40	63	7 x 2.75	128K/512K	4 - 6 weeks	3	Proprietary spreadsheet; 1-2-3-compatible, outputs ASCII and database text	Proprietary text editor; outputs ASCII file, automatic word wrap capabilities	No	To-do list in database	Xtern-PD	$299.40
Casio, Inc. (201) 361-5400	Boss SF 9500	IBM PCs and compatibles, Apple Macintoshes	9 ounces	0.75 x 6.63 x 3.38	6 x 32	40	6.63 x 3.38	64K/RAM cards	75 hours	3	None	None	No	None	Casio, built-in	$330
DAP Technologies Corp. (813) 289-3822	Microflex PC 1000+	MS-DOS-based PCs and compatibles	2.25 pounds	4.4 x 8.2 x 10.4	16 x 21	47	3.75 x 5.0	256K/40M	16 - 48 hours	Battery pack	None	Microsoft Edlin, outputs ASCII file	Yes	None	DAP'sCOM	$1,750 - $2,900, depending on memory configuration
	Microflex PC9000	MS-DOS-based PCs and compatibles	2.16 pounds	3.8 x 1.6 x 8.8	16 x 21	47	3.5 x 4.5	256K/40M	16 - 48 hours	3	None	Microsoft Edlin, outputs ASCII file	Yes	None	DAP's COM	$2,750 - $4,700, depending on memory configuration
Hewlett-Packard Co. (800) 443-1254	HP 95LX	MS-DOS-based and IBM compatibles	11 ounces	6.3 x 3.4 x 1	16 x 40	40	6 x 2.5	512K/2.5M	3 months	2	Lotus 1-2-3 version 2.2, 1-2-3-compatible, outputs ASCII and database text	HP Memo Editor; outputs ASCII file, automatic word wrap capabilities, insertion of text from another file, cut and paste, copy and paste	No	Appointment and phone book; one page per appointment memo capacity, to-do list, search capability, repeat appointments, worldwide time, stop watch, cut and paste	HP F1001A connectivity pack	$699
Hunkey Computers, Inc. (813) 530-4141	Hunkey Hunter 18	IBM PCs and compatibles	3 pounds	8.8 x 8.6 x 1.4	6 x 40	67	8.2 x 2.75	512K/8M	30+ hours	4	None	Hunkey Text Editor; outputs ASCII file		None	Kermit	$2,995 (512K of RAM)
Infogrip, Inc. (504) 336-0033	Mini Bat	IBM PCs, Apple Macintoshes	12 ounces	7 x 3.5 x 0.8	4 x 75	64	6 x 2.5	32K/256K	80 hours	1 nicad	Proprietary spreadsheet; 1-2-3-compatible, outputs ASCII and database text	Proprietary word processor; outputs ASCII file, automatic word wrap capabilities	No	To-do list, calendar	Proprietary; PC, Macintosh links	$595
Poqet Computer Corp. (408) 983-0500	The Poqet PC	MS-DOS-based IBM PCs and compatibles	1.3 pounds	1 x 8.8 x 4.5	80 x 80	77	8.4 x 4	640K/8M	60 - 100 hours, depending on application	2	None	Poqetwrite; outputs ASCII, automatic word wrap capabilities	No	Memo capacity is as large as memory card, to-do list, calculator, address book	Poqet Link	$1,500 includes CPU, Poqet Talk, Poqet Tool
Psion, Inc. (617) 237-8538	Series 3	Psion MC400, Psion HC handheld	8.5 ounces	8.2 x 3.2 x 0.6	8 x 40	58	8.2 x 3.3	128K/256K + 4M (data storage disks)	2 - 4 months	3	Proprietary spreadsheet	Psion Word Processor; outputs ASCII file, automatic word wrap capabilities, standard page layout	Yes	Database management software, to-do list	Built-in	$495.95 (256K memory), $449.95 (128K memory)
Seiko Instruments (310) 817-0183	32K PC Link Data Directory	IBM PC	3.2 ounces	3.13 x 6.13 x 0.38	3 x 16	44	4.63 x 1.75	32K/32K	3 years	3	None	None	No	Memo function	PC Link Traveling Software	$100 includes PC Link, cables, software
Sharp Electronics Corp. (800) 321-0677	PC 3000	IBM PCs and compatibles	1 pound 3.75 ounces	8.8 x 4 x 1	80 x 80	77	8.4 x 3.1	1M/1M	35 hours	3	Proprietary spreadsheet	Proprietary text editor	Yes	Memo functions, to-do list, scheduler, telephone directory	Laplink	$1,499
	Wizard Electronic Organizer, Model OZ-8200	IBM PCs, Apple Macintosh	18.2 ounces	7 x 3.7 x 0.7	8 x 80	80	6.3 x 3	128K/Unlimited	6 months	4	Sharp 3-dimensional spreadsheet manager; 1-2-3-compatible	Proprietary text editor outputs ASCII file, automatic word wrap capabilities	No	Unlimited memo capacity	Sharp Organizer Link II (for IBM or Macintosh)	$399

[1]Weight is with maximum RAM included.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Contact vendor for further product information.

BUYERS' SCORECARD

Dissatisfaction with name-brand PCs grows

Personal computers

Product scores reflect average user ratings for all measured areas, weighted by user-assigned importance. Response base: 50 users per product

Product	Highest ratings	Lowest ratings
Compaq's Deskpro SCORE 64	Availability of application software Compatibility with current software Reliability	Value for the dollar Vendor technical support Responsiveness of vendor service
Hewlett-Packard's Vectra 386 SCORE 62	Availability of application software Compatibility with current software Reliability	Responsiveness of vendor service Effective disk speed Value for the dollar
IBM's PS/2 (386) SCORE 61	Availability of application software Compatibility with current software Reliability	Responsiveness of vendor service Value for the dollar Effective disk speed
Apple's Macintosh II SCORE 60	Ease of use Reliability Memory capacity	Responsiveness of vendor service Vendor technical support Value for the dollar
AT&T Information Systems' 6386 SCORE 58	Availability of application software Compatibility with current software Ease of use	Responsiveness of vendor service Value for the dollar Availability of upgrade options

BY MICHAEL L. SULLIVAN-TRAINOR
CW STAFF

An abundance of lower priced alternatives appears to be making owners of "name-brand" personal computers more critical of their chosen machines.

Their dissatisfaction was evident in *Computerworld*'s Buyers' Scorecard on PCs from the Top 5 commercial vendors. Buyers at 250 user companies gave their PC products an average score of 61, 20 points below the maximum possible score of 81.

This continues and deepens a pattern that emerged last year, when the average satisfaction rating for the same name-brand products — Compaq Computer Corp.'s Deskpro, Hewlett-Packard Co.'s Vectra 386, IBM's Personal System/2, Apple Computer, Inc.'s Macintosh II and AT&T's 6386 — was 64 out of a possible 81.5.

Highest possible score	81
Mean score	61

Ratings of value for the dollar were also lower this year than last. In the 1990 poll, users gave their products an average of 7, while this year, the mark was lowered to 6.5. At the same time, the category increased in importance to users, moving from eighth place to sixth.

This year, the Deskpro led the pack, pulling ahead of last year's winner — the Vectra 386 — with an overall score of 64, compared with Vectra's 62.

Deskpro also came the closest to perfect 10s in two categories: compatibility with current software (9.2) and availability of application software (9.3). The PS/2, which ranked third with a score of 61 from its users, achieved the third-highest individual rating: 9.0 in the software availability category.

The survey asked 250 buyers of these brands of PCs at large installations in Fortune 1,000 companies to rate only the family of PCs they are currently using. Fifty respondents were surveyed for each product type. Overall scores were derived by multiplying the ratings each respondent group gave its own product family by the importance factors all users assigned to the criteria (see methodology next page).

As in 1990, the buyers surveyed rated reliability as the most important factor. But while the Vectra topped this category in 1990, the Deskpro edged ahead this year, achieving an 8.9 rating.

The Macintosh topped the value for the dollar category with a 6.8 rating. The ratings for this category ranged from 6.3 for the PS/2 to 6.8 for the Macintosh.

Although new software, such as Microsoft Corp.'s Windows 3.0 and DOS 5.0, enables buyers to make IBM PCs and compatibles more user-friendly, the Macintosh is still the ease-of-use leader. Its users gave the Macintosh the highest ratings in that category for the second consecutive year.

Macintosh users were critical, however, when it came to compatibility categories, giving the machine the lowest ratings for these particular attributes.

While Vectra received second- or third-place ratings for most of the categories, users clearly appreciated HP's efforts in technical support and documentation quality: Vectra topped both of those categories. ●

KEY RATINGS

Sign of the times: Marking a change from last year's survey, PC users rated value for the dollar (8.6) of greater importance than ease of use (8.2). Apple's Macintosh achieved the highest ratings in both areas, preventing Compaq's Deskpro from making a clean sweep by Compaq's Deskpro of the key ratings.

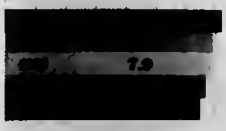
User importance rating.

A CLOSER LOOK

With 12 areas to choose from, users selected ease of use, upgradability, and ease of maintenance as higher priorities than documentation and number of ports. IBM's Personal System/2 achieved three top ratings, sharing the highest ratings in the vendor service category with HP's Vectra. AT&T's 6386 failed to gain a highest rating in any category.

8.2 Ease of use

8.0 Memory capacity

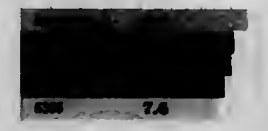


7.7 Effective disk speed

8.2 Availability of upgrade options

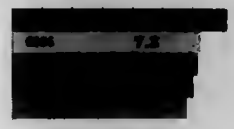
7.9 Ability to configure

7.6 Ease of installation

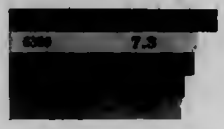


8.2 Ease of maintenance

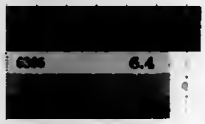
7.8 Effective processor speed



7.5 Sufficient number of ports



8.1 Responsiveness of vendor service



7.8 Vendor technical support

7.4 Quality of documentation

Loyalties

Would you buy the product again?
(Reasons are based on most frequently stated responses)

Deskpro
Response base: 50

Number of respondents

Likely
The reason: High quality/ Reliability

Unlikely
The reason: Price/ performance ratio not favorable

Vectra
Response base: 50

Number of respondents

Likely
The reason: High quality/ Reliability

Unlikely
The reason: Price/ performance ratio not favorable

PS/2
Response base: 50

Number of respondents

Likely
The reason: Compatibility/ Networking

Unlikely
The reason: Price/ performance ratio not favorable

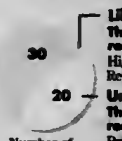
Macintosh II
Response base: 50

Number of respondents

Likely
The reason: Ease of use

Unlikely
The reason: Incompatible/ Hard to network

6386
Response base: 50



Number of respondents

Likely
The reason: High quality/ Reliability

Unlikely
The reason: Price/ performance ratio not favorable

Verbatim

What do you like best/least about this product?
(Responses are based on most frequently stated answer)

	Likes	Dislikes
[redacted]	Reliability/quality Compatibility/flexibility Speed of system	Expensive Vendor support Inability to upgrade processor
[redacted]	Reliability Flexibility Reputation of vendor	Expensive Incompatibility Monitor/screen
[redacted]	Compatibility Reputation of vendor Reliability	Expensive Expansion options Speed of system
Macintosh II	Ease of use Graphics capabilities Flexibility	Incompatibility Expensive Vendor support
6386	Reliability/quality Speed of system Flexibility	Incompatibility Price Vendor support

METHODOLOGY

Products rated in *Computerworld*'s Buyers' Scorecard on personal computers were selected in the following manner: The products had to be from one of the five leading PC vendors in the commercial Fortune 1,000 marketplace, based on number of installations and revenue.

Within that sample, they also had to be the largest capacity, most widely installed systems that were comparable in terms of size and capability.

The PCs were rated as a family rather than as individual models and configurations.

The telephone survey was conducted and tabulated by First Market Research in Austin, Texas, using names selected randomly from nonvendor sources.

A minimum of 50 users was required for each product set.

Total weighted scores were computed by multiplying the mean scores that users assigned their products by the mean scores that users assigned the importance of each criterion.

Overall scores are the average of these calculations for each product set.

RESPONDENT PROFILE

Most of the 250 respondents (31%) purchase their PCs through dealers, while 21% purchase them directly from the vendor, and 18% buy them retail.

Slightly more than half of the respondents (51%) have not standardized on a particular PC brand; 48% have standardized.

Forty-four percent of the respondents are responsible for purchasing and supporting more than 100 PCs; 15% purchase and support more than 50 PCs; 38% purchase and support between 10 and 50 PCs.

Forty-nine percent of the respondents were managers, 23% were staff members, and 19% were directors.

ACKNOWLEDGMENTS

Computerworld thanks the following individuals and organizations for their assistance in the preparation of this edition of Buyers' Scorecard: Computer Intelligence; Dataquest, Inc.; Bruce Stephen, International Data Corp.; and Tom Wilmott, Aberdeen Group.

Fax modems offer convenience, demand power

BY JEREMIAH CARON

When the first wave of fax add-in boards appeared, many skeptics asked, "Why can't these things act as a straight modem, too?"

It was a good question, considering that the two services go hand in hand: Over a single phone line, users would be able to communicate with another personal computer, host system, on-line information service or bulletin board, as well as write, review, edit, send and receive fax transmissions.

Apparently, the vendors thought the question worth answering. Today, add-in modem boards providing both data and fax communications capabilities are in large supply at agreeable prices.

About 200 vendors currently manufacture fax/modem boards for both PCs and laptops, with the large majority of these products ranging in price from $100 to $450.

Of course, nothing is ever as cheap or easy as it seems. Because fax software converts all data into graphics elements for transmission, it puts a large storage and performance burden on the PC.

Among the 200 or so product offerings, there isn't a whole lot of choice in terms of transmission speed. All boards on the market transmit data at a low but acceptable rate of 2.4K bit/sec. with standard Microcom Networking Protocol error correction and data compression. Fax transmission, which adheres to CCITT Group III standards, is 9.6K bit/sec.

Software is where vendors start to differentiate among their offerings. Some software comes standard, such as fax/communications software that sets up and maintains the directory, facilitates file import and export and provides autodialing.

Also bundled is fax control and telephone line management software. However, sophistication can vary here, and only some fax/modem boards include an asynchronous communications software module for data transfer duties.

All boards include software that allows the user to designate whether an incoming fax should be directed to the PC's hard disk or to a laser printer. However, with some boards, you can get fancy with how the printout looks. Everex Systems, Inc.'s Efax3 software bundled with the Everfax 24/96 board provides graphics and font-handling facilities for what-you-see-is-what-you-get manipulation.

It is also important to check whether the bundled software truly supports background operation. In some packages, the software acts as a terminate-and-stay-resident program that can easily be toggled on when necessary.

A feature that distinguishes between low-end and high-end fax/modem boards is the presence of a dedicated coprocessor, which can significantly affect performance. The popular Intel Corp. Satisfaxtion fax/data modem board is an example of a high-end product, while Image Communications, Inc.'s Twincom 24/96 with Smith Micro Software, Inc.'s Quick Link II software is representative of the low end.

Keep in mind that if you plan to fax a lot of preprinted materials such as graphics, you will need to purchase a compatible scanner.

Fax/modem boards will be of particular interest to portable computer users. This market is fortunately well served by the vendor community, with most top-notch laptop and notebook PCs either including or supporting internal data/fax modem options. ■

Steve Musgrave

Caron is the senior group editor for the microcomputer-related services provided by Faulkner Information Services, Inc. in Pennsauken, N.J.

Sampling of fax/modems

Image Communications, Inc.
Twincom 24/96
$149 Coprocessor not included

Complete PC, Inc.
Complete Modem
$199 Coprocessor not included

Computer Peripherals, Inc.
Viva
$349 Coprocessor included

Everex Systems, Inc.
Everfax 24/96
$399 Coprocessor included

Intel Corp.
Satisfaxtion
$499 Coprocessor included

(All allow background operation)

This listing includes major vendors of fax/modems. It is in no way comprehensive.

CW Chart: Marie Haines

High-capacity hard drives ease storage, performance woes

BY ALAN RADDING

So, you want more storage in your personal computer or portable? There's more than one way to get it and a couple of innovative ways to increase performance to boot. But along with the variety comes a price tag, so don't expect to get it cheap.

The typical Intel Corp. 80386- and I486-based PC is sold with 100M- to 300M-byte magnetic disk drives (either 5¼- or 3½-in.), but you can easily get additional drives offering from 1G to just under 2G bytes on 5¼-in. disks.

Radding is a free-lance writer based in Newton, Mass.

Capacities in the gigabyte range should also soon appear on 3½-in. drives now that IBM has broken the 1G level on that form factor, says Robert Abraham, vice president at Freeman Associates in Santa Barbara, Calif. Quantum Corp. also recently announced a 1G-byte, 3½-in. drives, which it expects to ship in March.

For laptop and notebook users, the action is focusing on 2-in. and 1.8-in. disk drives, although 3½-in. is more prevalent, and only a few vendors have started to offer the smaller form factor.

The current high capacity in 2-in. drives is 80M bytes, says Robert Katzive, vice president of Disk Trend, Inc. in Mountain View, Calif., but 120M-byte drives are expected later this fall.

With laptops and desktop PCs alike, high-performance drives today offer access times of at least 20 msec, with new top-end drives nearing 15 msec and less. Some of the better ones also offer mean-time-between-failure rates of up to 200,000 hours, Katzive says.

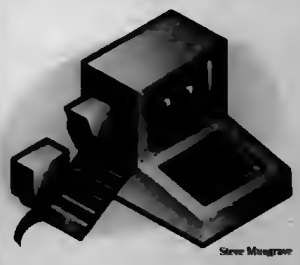
However, don't immediately assume the larger the drive, the better the performance. "You may save a few hundred dollars when you buy one large [1G-byte] drive, but you can do some performance things when you split data between two smaller drives," explains Lee Eliser, president of Data Storage Concepts in Boulder, Colo.

You could also purchase a formal disk array system, putting the controller in charge of spreading data across multiple disks. Disk arrays can boost either the number of I/Os per second or the transfer rate.

Such controllers can get expensive, however, so disk array technology is probably not economically feasible for less than three drives, Eliser says.

Disk caching is another way in which high-performance drives increase performance. With caching, an intelligent drive controller automatically brings the next likely data to be requested into a buffer or cache.

You usually pay at least 25% more for



Steve Musgrave

the drive when it includes caching, although the price depends on how many megabytes of caching you request. It is usually sold in 1M-byte increments on high-end drives.

On noncaching magnetic drives, the per-megabyte price is dropping by 20% a year, but look out — that adds up fast when you want a lot of capacity. A 1G-byte drive costs $3,000 to $6,000 retail, two to three times its OEM price, Katzive says.

The most expensive drives are from brand-name vendors such as IBM, Maxtor Corp., Micropolis Corp., Western Digital Corp., Fujitsu America, Inc., Hitachi America Ltd., Seagate Technology, Inc. and Conner Peripherals, Inc.

Some PC vendors have gone beyond magnetic and now offer the option of optical disc drives in their machines.

The biggest advantage of optical discs is their removability. Once the disk is full, you can substitute it for another one. However, while drive manufacturers have made progress in optical drives for PCs, they do not yet rival magnetic disk storage in access time, capacity or initial price. Optical speeds are about 35 msec.

The 5¼-in. erasable optical drive format stores 325M bytes on each side of the disk, 650M bytes total. The 3½-in. format stores 128M bytes, with current models only using one side of the disk.

The drives also cost more per megabyte, but you can find a good deal.

Street prices are aggressive, with $3,000 optical drives selling for as little as $1,200, according to William Odell, senior system analyst at Rothchild Consultants in San Francisco. •

▶See listing of hard drives with 1G byte and above, page 116.

Internal hard disks for PC and Macintosh[1]

VENDOR	PRODUCT	DRIVE: INTERNAL/EXTERNAL	HEIGHT	DRIVE CAPACITY (BYTES)	COMPATIBLE HARDWARE	FORM FACTOR (INCHES)	AVERAGE SEEK TIME (MSEC)[2]	AVERAGE ACCESS TIME (MSEC)[3]	PEAK TRANSFER RATE (MEGABIT/SEC.)[4]	UTILITY SOFTWARE	WEIGHT (POUNDS)	DIMENSIONS (INCHES)	WARRANTY	PRICE	COST PER MEGABYTE	DRIVE MECHANISM MANUFACTURER
CMS Enhancements, Inc. (714) 223-8000	Platinum P1 1000A	Internal	Full height	1.007G	Apple Macintosh	3.25	15	15	19.0 asynchronous, 32 synchronous	Diagnostics, utilities	10	8 x 3.25 x 5.75	One year	$4,900	$4.96	CMS
	Sentry P1.051-HV	Internal	Full height	1.2G	IBM PCs and compatibles	5.25	14	14	11.5 asynchronous, 32 synchronous	Diagnostics	8.4	8 x 3.25 x 5.75	One year	$4,795	$3.99	CMS
Fujitsu America, Inc. (408) 432-1300	M2266A	Internal	Full height	1.208G unformatted	Any machine with a SCSI interface	5.25	14.5	14.5	38.4 synchronous	None	7	8 x 5.7 x 3.3	Five years	Contact vendor	Same	Fujitsu America
Hewlett-Packard Co. (800) 752-0900	HP Hard Disk Drive series for the Macintosh Quadra 900	Internal	Full height	677M, 1.07G, 1.355G	Apple Macintosh Quadra 900	5.25	13.5	7.5	12 asynchronous, 30 synchronous	Diagnostics, HP formatter	9.0	8 x 5.75 x 3.25	One year	$3,295 - $5,995	$4.87 - $3.39	HP
General Microsystems, Inc. (206) 644-2233	WH/D 220GB-PC	Both	Full height	1.2G	IBM PC/AT and up	3.25	15	23	23	Diagnostics, utilities	7.6	8 x 5.75 x 3.3	One year	$3,495+	$2.81	Seagate
Maxtor Corp. (408) 432-1700	Panther 1.2	Both	Full height	1.2G	Any machine with a SCSI interface	3.25	13	NP	29.7	None	7.4	9.0 x 5.75 x 5.25	Two years, extended five-year warranty available	Contact vendor	Same	Maxtor
	Panther 1.7	Both	Full height	1.7G	Any machine with a SCSI interface	5.25	13	NP	29.7	None	7.4	9.0 x 5.75 x 5.25	Two years, extended five-year warranty available	Contact vendor	Same	Maxtor
Michael Technology, Inc. (714) 837-0033	Micro/fil-1000NP, 1350NP	Internal	Full height	1.011G, 1.350G	Macintosh II, IIX, IIFX	5.25	NP	18	20, 25.6	Utilities, hard drive setup, testing program	5	Manufacturer's specs	One year, extended warranty available	$5295 - $6,195	$5.23 - $4.59	Seagate
	AT-1000/LAN, AT-1300/RA/LAN	Internal	Full height	1.035G, 1.230G	IBM PCs, 286-, 386-, 486-based machines and compatibles, file servers operating under Novell Netware	5.25	NP	15, 11.5	20, 29.6	Diagnostics, utilities, optimization software	5	Manufacturer's specs	One year, extended warranty available	$5,280 - $7,480	$5.11 - $5.67	Seagate
	AT-1000/UX, AT-1000/DOS	Internal	Full height	1.035G	AT-100/UX, IBM PCs, 286-, 386-, 486-based machines and compatibles	5.25	NP	15	20	Diagnostics, utilities, optimization software	5	Manufacturer's specs	One year, extended warranty available	$5,130	$5.01	Seagate
	PS-1000/PS/2	Internal	Full height	1.035G	IBM PS/2 Models 502, 55, 60, 70, 80, EMCA-compatible systems	5.25	NP	15	20	Diagnostics, utilities, optimization software	5	Manufacturer's specs	One year, extended warranty available	$5,330	$5.15	Seagate
Micropolis Corp. (818) 709-3300	1518	Internal	Full height	1.524G unformatted, 1.346G formatted	IBM PC/AT, DOS-based systems	5.25	14.5	22.83	23.33	Diagnostics, utilities	8.2	8 x 5.75 x 3.25	Five years for authorized resellers	$3,610	$2.38	Micropolis
	1528	Internal	Full height	1.208G unformatted, 1.064G formatted	DEC, DOS-based, Macintosh, Next, Sun	5.25	14.5	22.83	30	Diagnostics, utilities	3.25	8 x 5.75 x 3.25	Five years for authorized resellers	$3,080 for authorized reseller	$2.56	Micropolis
	1538	Internal	Full height	1.538G unformatted, 1.354G formatted	DEC, DOS-based, Macintosh, Next, Sun	5.25	14.5	22.83	23.33	None	3.25	8 x 5.75 x 3.25	Five years for authorized resellers	$3,610	$2.35	Micropolis
	1908	Internal	Full height	1.6G unformatted, 1.408G formatted	DEC, DOS-based, Macintosh, Next, Sun	5.25	11.5	17.08	30 - 40	None	8.2	8 x 5.75 x 5.25	Five years for authorized resellers	$4,130	$2.56	Micropolis
	1548	Internal	Full height	2G unformatted, 1.760G formatted	DEC, DOS-based, Macintosh, Next, Sun	3.25	14	22.33	24 - 38	None	8.2	8 x 5.75 x 3.25	Five years for authorized resellers	$5,180	$2.50	Micropolis
Morton Management, Inc. (301) 623-5600	Gigabyte	Both	Full height	1.0G	Any machine with an XT/AT or EISA bus	3.25	14	NP	30	Drivers	30	15 x 17 x 7	Three years	$5,496	$0.10	HP
Optima Technology Corp. (714) 476-0515	Centurie 1050	Both	Full height	1.05G	IBM PCs and compatibles, Macintosh	5.25	14.5	NP	30	Diagnostics, utilities	12.5	4.36 x 11.42 x 10.23	One year upgradable to three years	$3,795	$3.61	Optima Technology
	Centurie 1350	Both	Full height	1.35G	IBM PCs and compatibles, Macintosh	5.25	13	NP	30	Diagnostics, utilities	12.5	4.36 x 11.42 x 10.23	One year upgradable to three years	$4,395	$3.25	Optima Technology
Peripheral Land, Inc. (510) 657-2211	PLI 1.2 GB Turbo	Both	Full height	1.2G	IBM PCs and compatibles, Macintosh	5.25	6.67	15	38.4	Backup, diagnostics, utilities, print spooling, turbo cache	9	11.5 x 9.5 x 4.75	One year, extended warranty available	$4,090, $3,999	$3.41, $3.33	Seagate
	PLI 1.35GB Turbo	Both	Full height	1.35G	IBM PCs and compatibles, Macintosh	5.25	8	11.5	30	Backup, diagnostics, utilities, print spooling, turbo cache	8	11.5 x 9.5 x 4.75	One year, extended warranty available	$4,090, $5,999	$4.51, $4.44	Seagate
Period Technology (408) 946-2220, (800) 447-0220	Laserdr 10005 for PC, Datamac 10005 for PS/2 or Macintosh	Both	Full height	2G - 5G formatted	IBM PCs, PS/2 Models 60/80, external available for other PS/2 models and Macintosh models	3.25	2	13	24	Diagnostics, utilities, drivers for Novell OS/2, Unix, Xenix	7	5.25 x 5.75 x 8.2	One year with option up to five years	$3,141 (PC), $3,684 (PS/2), $3,157 (Mac)	NA	Maxtor
	Laserdr 10005 for PC, Datamac 10005 for PS/2 or Macintosh	Both	Full height	2G formatted	IBM PCs, PS/2 Models 60/80, external available for other PS/2 models and Macintosh models	5.25	2	13	24	Diagnostics, utilities, drivers for Novell OS/2, Unix, Xenix	7	5.25 x 5.75 x 8.2	One year with option up to five years	$2,377 (PC), $3,080 (PS/2), $2,560 (Mac)	NA	Maxtor
Seagate Technology, Inc. (512) 921-6020	Elite, ST41600N	Internal	Full height	1.6G	Any machine with a SCSI interface	3.25	11.5	17.08	30	None	3.0	8 x 5.75 x 3.25	One to five years	$3,450	$2.16	Seagate
	ST11200N	Both	Half height	1.2G	Any machine with a SCSI, SCSI-2 interface	3.5	10.5	17.2	32	None	1.97	5.75 x 4 x 1.63	One year	$1,805	$1.50	Seagate
	Wren 9, ST41601N	Both	Full height	2.1G	Any machine with a SCSI, SCSI-2 interface	3.25	12.5	21	30	None	7.6	8.5 x 5.75 x 3.25	One year	$3,795	$1.81	Seagate
	Wren 8, ST41401N	Both	Full height	1.05G	Any machine with a SCSI, SCSI-2 interface	3.25	15	23	30	None	7.6	8 x 5.75 x 3.25	One year	$2,755	$1.67	Seagate
	Wren 7, ST41200N	Both	Full height	1.2G	Any machine with a SCSI, SCSI-2 interface	3.25	15	23	23	None	7.6	8 x 5.75 x 3.25	One year	$3,380	$1.90	Seagate

[1]Hard disks are 1G byte and higher. [2]Average time needed to position read/write head at specified point. [3]Average interval between a request to read and the beginning of data transfer. [4]Maximum rate at which data is moved from hard disk to system.

This listing includes major vendors of hard disks; it is not intended to be comprehensive. Vendors that did not respond to the survey are not included in the chart. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Contact vendor for further product information.

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Quality time

Quality development goes beyond just zeroing in on poor systems. It consists of scrutinizing the quality assurance organization as well

BY ROBIN F. GOLDSMITH

You've had a recurring nightmare that's had you sitting bolt upright in bed every morning around 3 a.m. It starts out innocently enough: The chief information officer decides the information systems department needs a quality assurance group as part of a total quality management initiative. (Or was the decision a result of a particularly bad IS problem? It doesn't matter — it's decided). IS management pledges its full support.

You're appointed quality assurance manager, and you throw yourself wholeheartedly into your work. Your first task is to figure out what a QA group should do. Your boss doesn't know the specifics; he just wants better system quality.

You figure out what "good" systems ought to look like, and you elaborate your ideas in a standards manual. You then educate people about the importance of quality.

Meanwhile, IS management mandates that software developers conform to your standards before their work is accepted.

Everything is going smoothly, but then the nightmare begins. Systems developers resent your group's oversight and start calling your team "impediments to progress," "traffic cops" and "pains in the neck."

To make matters worse, an important new program is behind schedule. The CIO wants to meet the deadline, so be circumvents your group and puts the program into production instead of waiting for your review. Soon, everything is too important to be delayed by QA. The entire effort is crumbling before your eyes.

You awake with a jolt.

Unfortunately, you can't leave the bad dream behind because you really *are* an IS professional trying to come to terms with quality assurance in your development organization.

There is hope for restful nights — and for quality IS development efforts. What you need to do is to improve the methods used to assure quality, particularly the ways QA groups work.

What are the critical factors for successful quality assurance? Defining and measuring IS quality meaningfully, delineating management's and individual developers' responsibilities and carrying out the proper role of the quality assurance function.

■ Definition and measurement

Until everyone in the organization agrees on an appropriate common definition of IS quality, it is impossible to produce systems that are of consistently high quality. Because few organizations have come to grips with this most fundamental requirement, they should not be surprised by frustrating results.

First of all, an appropriate definition must make sense to all involved. Typical organizational definitions have tended to be problematic because technical and nontechnical people usually have different perceptions of system quality.

Users (and even some IS managers) may be oblivious to the types of technical factors developers frequently equate with system quality, such as structured source code elegance, clever techniques, nanosecond-level efficiency and use of the latest technologies. They may go to great lengths to modularize, eliminate GOTOs and achieve structured code elegance.

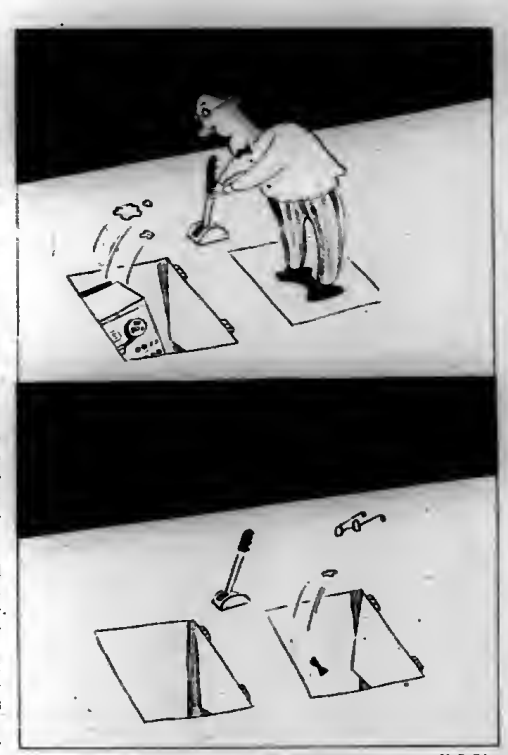
Developers, on the other hand, rarely think of quality systems in terms of ease of use, unquestioned accuracy and reliability and rapid, responsive assistance — characteristics important to users.

Without recognition of what users want, developers may plow ahead to achieve a technical gem, while potentially wreaking havoc on deadlines and budgets. The end result is a program that fails to meet the user's definition of quality.

A solid definition of systems quality must include both perspectives.

Appropriate definitions are stated in positive terms. Some definitions of quality are purely negative — that is, quality is inferred by the lack of defects. Defects are important, but they are only part of the story.

Continued on page 120



M. E. Cohen

Goldsmith is president of Go Pro Management, Inc., a Needham, Mass., consulting firm that works with IS departments in the areas of software testing and quality.

- **Three critical success factors**
- **Why quality assurance groups fail**
- **Six functions of a quality assurance team**

Continued from page 119

What the QA group needs to do is distinguish levels of quality in positive terms — how much a product does and how well it does it. Moreover, the definition must fit all situations. IS tends to be aware of and measure only a few defects.

Current practices tend to overlook the types of defects that would be most meaningful for improving system quality. Often, for example, patterns of minor defects, such as slow response time, high disk utilization or even increases in user questions, can warn of pending problems.

Effective QA efforts have been characterized by milestone reviews of feasibility analyses, requirements definitions and system designs. Similarly, they place greater attention on improving the ability of unit and integration testing to catch errors closer to their source.

Finally, a good definition of quality is one that is objectively measurable. Some organizations rely on definitions that may hold traps. For example, "conformance to requirements" and "meeting or exceeding customer expectations" are common items in software quality definitions. These phrases both touch on key elements of quality, but they rest on subjectivity, which can be arbitrary.

Such reasoning can lead to absurd logical extensions. For example, a crummy end product could be considered high quality if it meets requirements that were not defined adequately or were not sufficiently demanding. Similarly, it would be a quality system even if riddled with errors, as long as the customer is unaware of the errors or expects them.

These definitions make quality a function of the observer rather than a function of the product itself. It then becomes easy to rationalize that systems really are high quality because the problem is the user, and every developer "knows" that users don't know what they want. Sound familiar?

A productive definition of quality that takes into account all the above criteria might go something like this: "Quality is the extent to which the system meets functionality, engineering and adaptability requirements of internal and external customers consistent with standards of design, workmanship and operation."

To see how this definition applies to systems development quality, take a company that is in the requirements stage of a system project. The company wants a system that displays five items of accurate information for the user within an average of 10 seconds.

Two standards are involved in this case: one defining levels of acceptable accuracy, the other defining response times. A system that could display only two of the items accurately within 10 seconds would be of lower quality. A system that displayed all five items within one second would be of higher quality.

■ IS management and individual developer responsibilities

Perhaps well-known quality proponent W. Edwards Deming's greatest contribution to quality is the recognition that management controls the processes within which individuals work and that the processes, far more than the individuals, determine the level of quality produced.

While IS management controls many processes — budgets and computer resource availability as well as selection of programming languages, standards, database management systems, packages and tools — developers exercise considerable discretion over what they do.

For example, many developers have almost total control over the design, coding and testing techniques they use.

Moreover, developers usually set their own limits on critical factors such as how they plan and use their time, how they communicate with others, how much initiative they take to anticipate and prevent problems, how much personal effort they invest in developing professionally, how well they identify with their internal and external customers and how much personal responsibility they take for the end product.

In this regard, individual developers control a large part of the quality process.

Because developers play such an integral role, the typical scenario in which IS managers simply proclaim that quality should be achieved, implore developers to work harder and more carefully, rely on testing of finished products to catch errors and then lambast developers in annual performace reviews for having produced poor quality systems is a dead end.

The quality assurance group must define appropriate roles and responsibilities needed to achieve a quality culture, taking into account developers' management characteristics. Only then will the environment fully enable developers to identify with their internal and external customers and to act like management, taking personal responsibility for the end product as well as for developing their own effectiveness.

■ Role of the IS quality assurance function

The operative word for a QA group is "useful." If quality assurance wants a developer to handle a process differently, it should first identify how doing so would be useful to the developer. If the developer does not believe the request is useful, listen. He may be right, and you may need to rethink your plan.

Within this framework of usefulness, effective QA groups perform six major functions:

▶ They define what to do. These groups prepare quality plans, identifying what must be delivered and how it will be checked to ensure it is accurate and complete.

Ordinarily, IS quality assurance works with the project manager to identify all necessary project deliverables, such as requirements, design, test plans, documentation, programs and testing.

Then the group allocates time and identifies resources to perform a QA review of each deliverable. Finally, it incorporates the quality plan's task responsibilities, deadlines and budgets into the overall project plan.

The person reviewing a deliverable must be familiar with the subject matter but must not have been involved with producing the deliverable under review. This unbiased reviewer could be from QA, a related development project, the user ranks, the auditing department or even a consulting firm.

▶ They define how to do it well. Quality assurance groups develop standards and conventions that describe quality in positive, objectively measurable terms.

IS quality assurance facilitates and administers IS standards. Thus, IS QA staffers should lead in identifying appropriate topics that promote system quality, including management processes, and should solicit input from all involved parties.

Positive standards define characteristics of minimum, target and ideal levels of quality relating to topics such as life cycle, project deliverables, testing documentation, screen readability, manual data entry procedures, security, backup and internal controls.

▶ They make sure it is done right. Quality assurance groups ensure that appropriate quality controls are exercised at all key points throughout the life cycle. Quality assurance does not necessarily perform quality control but should make certain that quality control is done in a reliable manner by someone with suitable knowledge and independence.

Quality controls include reviews of project deliverables, carrying out the technical testing life cycle (unit, integration, stress and acceptance tests) as well as various functions that affect all projects, such as production control, security, project control, documentation control

Good intentions don't assure quality

QA groups can fail by sabotaging rather than enhancing procedures

The problem for most IS organizations is that there are relatively few successful role models on which to base a quality assurance effort. In fact, a Quality Assurance Institute survey a few years ago found that one-third of all QA groups fail within two years of their formation. Anecdotal information suggests that as many as another one-third of these groups are "walking dead" — hanging on despite being woefully ineffective.

It's difficult to look for guidance from examples that can only teach you to fail. Many of these failed organizations blame the usual targets — IS management, which is viewed as not being willing to do what is necessary to turn out quality systems, and developers, which are seen as not appreciating how good QA can be for them.

Chances are, however, that this blame might be misplaced. What is likely to be true (but hard to accept) is that in most cases, a quality assurance group's own poor performance causes management to withdraw its support, not the other way around. Even though a group may sincerely care about quality and may try hard, it might not be perceived as improving system quality appreciably. In fact, it may be seen as getting in the way of quality.

When looking to pinpoint blame, most QA groups should look no further than themselves.

What an IS quality assurance group does and how it expends its effort determine its results. Here are common failings among QA groups:

• **They overemphasize quality control, testing systems at various stages to catch existing defects.** Because quality control is only one part of QA, QA groups that stress quality control heavily tend not to do other important parts of the quality assurance job. They do not identify ways to improve processes that would prevent errors from being made in the first place, which would reduce the otherwise never-ending reliance on testing to catch errors.

• **They dilute their effectiveness by trying to do too many things themselves.** Such ambitious QA groups may write a thick standards manual and then try to review every source program from all applications for compliance. There may be more programs than they can handle. With time at a premium, they can overlook matters of substance in these standards, such as whether the program functions correctly.

Similar problems can plague IS quality assurance groups involved in testing other systems development products, such as requirements, designs and executable programs. Effective testing of these products requires extensive knowledge of the application. Yet IS QA groups charged with personally testing many applications may lack the time to develop expertise in any of them. Without such knowledge, testing often becomes perfunctory.

• **They have a bad attitude.** The QA group is frequently characterized as having an attitude of "Do it my way because I know what is best." Appearances of arrogance can be self-defeating. Answering the developer's question of "What's in it for me?" is more likely to be well received.

ROBIN F. GOLDSMITH

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▶They keep track of it. These groups ensure that suitable quality records are maintained. Records of quality include quality assurance plans, test plans, test design specifications, test cases, testing procedures, review results, test logs, test results, incident reports, indications of corrective actions, status reports and project sign-offs.

▶They learn from it. Quality assurance groups analyze quality records to identify opportunities for improving standards, training, methods, tools, testing, staffing, management practices and the QA function itself.

IS quality assurance is uniquely situated to draw on information from various projects and applications. By analyzing current quality levels and problem areas, IS quality assurance can identify patterns that can suggest wide-reaching changes.

For example, frequent problems involving disk storage could suggest the need for more capacity or better file management practices. Similarly, QA might identify opportunities to use a computer-aided software engineering tool to generate higher quality system design documentation and thereby improve resulting system quality.

▶They encourage it. QA groups establish and maintain an environment that promotes quality. Typical current quality assurance group activities often include quality awareness programs and training in use of quality control techniques. To have a lasting impact, these activities must be supplemented with management behavior changes that make quality a part of the reward structure.

For example, some organizations routinely perform post-implementation reviews on all new projects. Instead of relying on the IS manager's subjective judgments, organizations use these objective measures of user satisfaction with the finished system to determine the project team's annual performance review.

However, quality assurance groups must provide adequate measures of quality before management can develop a culture that rewards all individuals based on quality of the end product over its entire useful life.

Few IS quality assurance groups perform all of these functions. They tend to be unaware of what to do and how to do it. But they can learn.

Only when these critical factors have been addressed will organizations feel confident that they can manage IS quality assurance successfully. ●

Stumbling blocks

What do quality assurance professionals view as the factors working against their effectiveness?

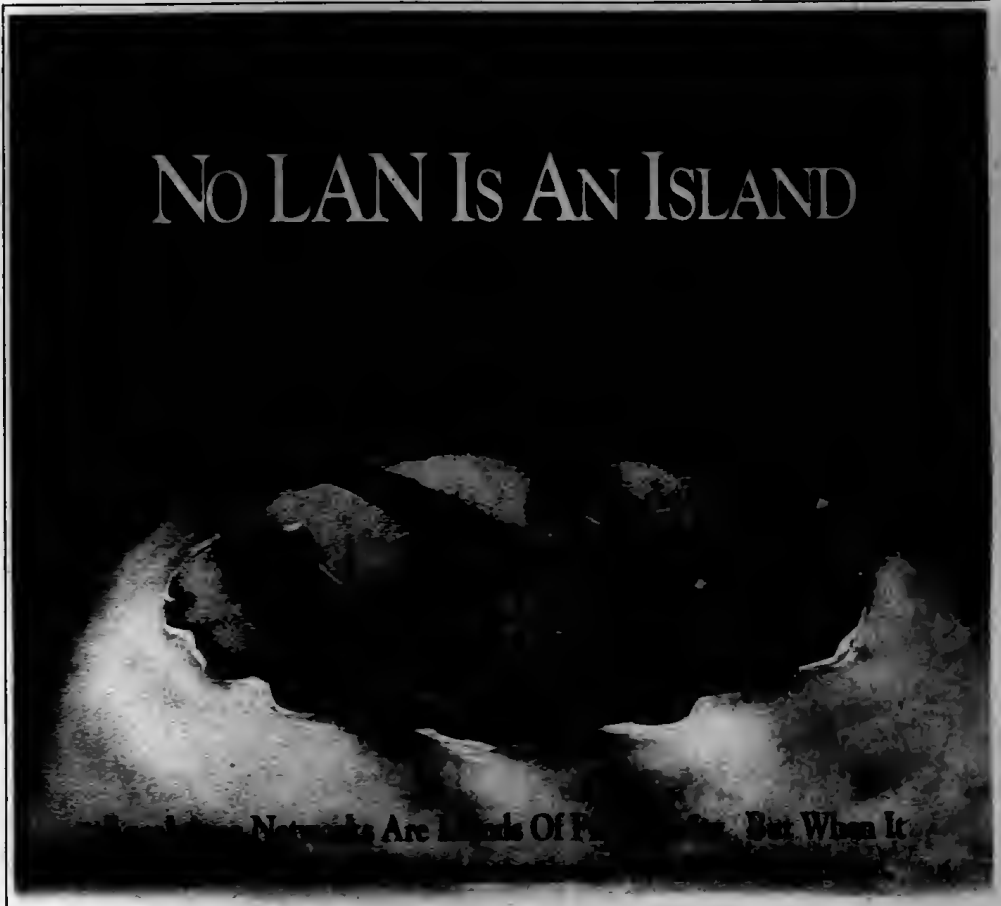
According to a 1990 survey of 126 quality assurance professionals by the Quality Assurance Institute in Orlando, Fla., problems include some of the following difficulties:

1. Many QA groups may not have a clear understanding of their purpose and mission.
2. A lack of quantifiable results or accomplishments on the part of QA groups may be contributing to a lack of management commitment and support for quality initiatives.

It's not enough to put a quality control process in place or to establish a standards committee. IS management wants to know the end result of doing those things: defects reduced, quality improved, dollars saved and so on.

3. The role the quality assurance function plays in implementation of quality programs may be a contributing factor to its lack of success and slow progress. QA may be too involved in the actual development and improvement of standards, procedures and measures.

It may help if QA groups act more as administrators and facilitators.



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NATIONAL
BRIEFS

Bigger picture

▶ Videoconferencing player **Picturetel Corp.** and telecommunications player **Nynex Corp.** last week sealed a deal to wed videoconferencing products to Integrated Services Digital Network services. The joint marketing agreement is aimed at making videoconferencing facilities more affordable and accessible to commercial users throughout New York and New England, according to a Picturetel executive.

Mips loss

▶ RISC technology player **Mips Computer Systems, Inc.** has warned that a shortfall in its licensing revenue is likely to "significantly increase" a predicted third quarter loss. Product revenue for the quarter closed Sept. 30, chief executive officer Robert C. Miller said, is on target. However, licenses are now estimated to yield between $3 million and $4 million for the quarter — an approximately 72% fall from the $12.3 million revenue stream that flowed into Mips' coffers in third quarter 1990. Mips will post its results on the Oct. 23.

Fujitsu split

▶ **Fujitsu America, Inc.** earlier this month split its operations into two units: San Jose, Calif.-based **Fujitsu Computer Products of America**, which will manufacture and market what its name implies, and Dallas-based **Fujitsu Network Transmission Systems**, which will make and sell telecommunications products.

Public interest

▶ The 1991 swarm of firms into the public market continues, with **Broderbund Software, Inc.** among the most recent to file an initial public offering. Based in San Rafael, Calif., Broderbund publishes and develops personal computer software aimed at the education, home and small business markets. The firm's proposed offering of 3,257,184 shares is expected to be priced between $9.50 and $11 per share. Also en route to the stock exchange is San Jose, Calif.-based **Centigram Communications Corp.** The audio information processing systems vendor went public earlier this month with a 1.8 million-share offering priced at $10.75 per share.

Micro channel shaking up, sorting out

BY MICHAEL FITZGERALD
CW STAFF

Suddenly in the dealer channel, you can't tell the players without a scorecard. In the past year, Computerland Corp. bought money-losing Nynex Business Centers; Businessland, Inc. was saved from bankruptcy by JWP, Inc.; Inacom Computer Centers, Inc. and Valcom, Inc. merged; and Compucom Systems, Inc. bought Computer Factory, Inc. — and that is naming only the biggest deals.

All the buyout action kicked up a lot of dust in the dealer channel, which will keep swirling — in users' faces to some extent, according to observers and reseller executives. Hardware costs will shrink, but users will pay more for service and support.

Meanwhile, the channel "is in for some quite significant changes," said Bruce R. Stuart, president of Channel Strategies, Inc., a management consulting firm in Vancouver, British Columbia.

"There absolutely is a crisis in the traditional channel," agreed Lee Levitt, distribution analyst at International Data Corp. in Framingham, Mass.

Levitt said the shift is caused by users. Once unfamiliar with personal computers, and hence in need of hand-holding, many users are now engaged in the complexities of building networks, which require more sophisticated support.

Levitt said this has created "two extremes: At one, you have essentially a commodity product where the end user knows what he has and is buying more of them. At the other, users are using the PC as a window into a much larger system — much more complex. So users either need no support or a lot of it."

The split in user needs will drive trends in the reseller market and perhaps decrease the confusion that surrounds it in the minds of consumers.

Observers said they see three trends for the near-term future of reselling:

1. Value-added will become de rigueur for dealers.

"Customers got spoiled in the '80s — they never had to pay for value-added services. Now, the cost and complexity of providing those services is increasing dramatically," said Michael Swavely, former president of Compaq Computer Corp. North America. "That's the Holy Grail of the reseller community — how to get the customer to understand and pay for the value-add they're trying to provide."

Alan P. Hald, vice chairman and co-founder of Microage, Inc., agreed. "As competitive pressures increase, everyone is forced to unbundle services," he said.

The end result for users is simple: "The innocent days are over," Stuart said. "[The channel] has figured out the true costs of managing a transaction, and what's going to start to happen is the customers are going to bear the full cost of purchases."

2. Continued consolidation will occur, forced by stagnant PC growth.

"The truth is, as far as I can tell, the whole industry [failed to] grow in the last six months," said William Tauscher, chairman of Computerland.

Tauscher and others said there is still too much capacity in the reseller channel, and rapidly shrinking profit margins will force more mergers.

3. Superstores and mail order are here to stay.

Superstores and high-volume discounters such as the Brand Central division of Sears, Roebuck and Co.'s Merchandise Group will take over the retail walk-in trade, while the traditional reseller channel focuses more heavily on businesses of all sizes, Hald and others said.

Numerous ventures, including one launched by Computerland, are testing the superstore waters.

Meanwhile, mail-order firms catering to basic technologies such as PCs will thrive.

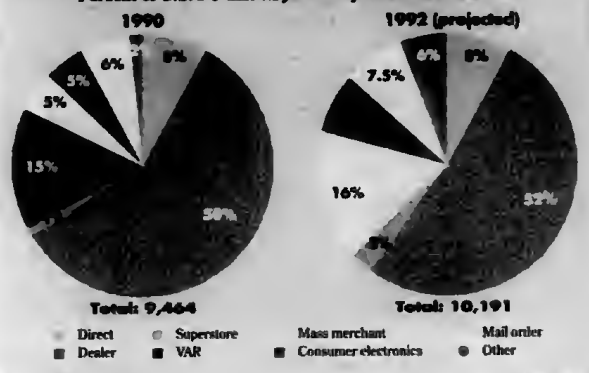
"Technology didn't change much in the last half of the 1980s . . . we'll probably continue to see reasonable growth in the the mail-order segment until technology changes significantly," Swavely predicted.

Continued on page 124

Dividing the wealth

The dealer channel will probably dominate PC distribution for some time to come, but mass merchants and consumer electronic stores are showing strong growth

Percent of U.S. PC unit shipments by distribution channel



Source: International Data Corp.

CW Chart: Michael Siggins

Microsoft airs strategic integrator program

BY JAMES DALY
CW STAFF

BELLEVUE, Wash. — Microsoft Corp. continued to wiggle into the systems integration business earlier this month by unveiling a program in which it will team up with large integrators to help users build client/server systems.

The Strategic Integrator Program will have one curious wrinkle, though. The integrator partners Microsoft chose — Bull HN Information Systems, Inc., Andersen Consulting, Electronic Data Systems Corp. and Digital Equipment Corp. — are renowned for building and managing big-iron systems rather than departmental client/server setups.

"We're taking our products upward while many systems integrators are dealing with the downsizing phenomenon — we met in the middle," said Tracy Scott, network channel marketing manager at Microsoft.

The synergistic relationship could also be a big plus for users tangling with the job of building complex systems, analysts said. "We're seeing many companies sink millions into system development, and years later they still haven't seen anything out of it," said Kevin Patrick Lynch, an analyst at G2 Research, Inc. in Mountain View, Calif. "Bringing in systems integrators is a good way to cut costs and increase productivity."

Although the Strategic Integrators Program will help users build nearly any type of system, it will be decidedly biased toward Microsoft products. For example, strategic integrators will use Microsoft's LAN Manager and SQL Server as the cornerstone of the client/server model, Scott said. Both LAN Manager and SQL Server connect desktop personal computers with the vast amounts of data stored in mainframes and minicomputers.

All four systems integrators are anxious to expand their scope downward. Paul Kelley, manager of desktop services at DEC, said the new pact allows his company to "expand our capability as a PC solutions vendor." Added Steve Gardner, president of Bull's new systems integration business unit: "Microsoft's networking products [already] play a key role in the Bull distributed computing model."

The Strategic Integrator Program is the latest step on Microsoft's road to establish itself in the integration market. The company formed an internal integration organization 18 months ago — recently renamed Education & Consulting Services — that offers products and assists in systems development.

Computerland: Out of the woods

William Tauscher

Three years ago, William Tauscher took over the reins as chief executive officer at Computerland — at that point a concern near death due to competition, bloated corporate costs and a near-revolt of dealers. Today, Computerland is the largest reseller in the U.S., with more than $3 billion in revenue. "We can say we're out of the woods," Tauscher said.

He credits the comeback to a solid distribution network built under President Ed Anderson and to a lucky break: Arch-competitor Businessland "turned out to be a rotten executor with a great strategy."

Computerland has nearly digested its acquisition of Nynex Business Centers and is aggressively buying out its franchisees in major corporate markets. It now owns or is the major financial partner of all its dealerships in the major metropolitan markets.

MICHAEL FITZGERALD

Micro channel

CONTINUED FROM PAGE 123

Many industry observers have pegged 1992 as the year in which vendors will be forced to begin restructuring their dealer relationships and in which dealers could begin offering customers far more than the limited mix of IBM, Apple Computer, Inc., Compaq and one or two other brands that has been their tradition until now.

"Since the channel was established, vendors have attempted to push support, brand management and primary service onto the dealer channel, and it was never designed to [handle] that," Stuart said.

"One of the concerns I have is that U.S. manufacturers are concerned and have been concerned about their market share, specifically vis-a-vis clones and Pacific Rim competitors," said Bill Fairfield, president of Inacom Corp., the combined firm that emerged from the recent merger of the Valcom and Inacomp dealer chains. "In their paranoia, they look around and blame the channel for not giving them breadth of coverage they need."

Fairfield said these pressures could prompt the dealer channel to support more clone vendors.

Tauscher said his company is negotiating with a number of clone makers. Computerland is talking with mail-order vendors such as Dell Computer Corp. and Austin Computer Systems, Inc. about distributing their products as well, be added.

Continued on page 125

INTERNATIONAL

BRIEFS

Don't tie up the phone

▶ **The European Commission** is preparing to force open telephone monopolies throughout its member countries, despite expected strong opposition from most of the monopolizers and the governments that typically own them, according to a report last week in the British financial press. The report said officials in the commission's competition and information technology directorates have already started work on liberalizing the market for telephone calls — turf worth some $80 billion a year and one of the largest sectors of the European economy now closed to competition.

Bull's worth

▶ The French state-controlled computer vendor **Groupe Bull** is worth at least $970 million, the Finance Ministry told the European business press last week. The value was set for a proposed direct sale of 4.7% of the firm to Japan's **NEC Corp.** in exchange for NEC's present ownership of Bull's U.S. unit, **Bull HN Information Systems, Inc.** Bull will hold a special meeting at the end of this month to approve the capital increase slotted for NEC, according to the report.

What's the buzz?

▶ Those who feel snowed under by a blizzard of buzzwords might welcome the following note. Speakers at a recent conference on outsourcing and systems integration held in **Sydney, Australia,** came up with two useful additions to the outsourcing/insourcing/downsizing/rightsizing page of the lexicon: **capsizing** — a handy word to describe what happens when you go overboard in revamping your systems; and **outsorcerers** — meaning outsourcing vendors who promise to work magic for their clients.

UK loves Unix

▶ **Unix** systems seem to be living up to the UK's great expectations, according to the results of a recent survey done by British market research firm **Romtec.** The report shows that 39% of major companies in the UK now use Unix-based systems somewhere in their organizations. A whopping 95% of the Unix users said they were satisfied. Some 44% of the firms surveyed said they were committed to an open systems strategy.

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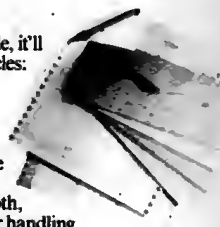

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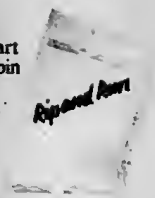

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THE STRAIGHT-PAPER-PATH.

Microage: On firm ground

Alan P. Hald

Amid the storm of mergers in the channel, there is the calm of Microage, Inc. Alan P. Hald, who co-founded the $800 million chain in 1976 and is its vice chairman today, said it will continue to shun the takeover method of growth. At the same time, he said, he welcomes developments such as the superstore. But unlike rival Computerland, Microage is not inclined to move into that market, he added. "My experience is when you spread yourself between two markets, it's like having one foot on the dock and one foot in the boat."

Instead, Hald said he is pushing Microage franchises to become more like systems integrators. "We are working to build our capabilities to serve the systems integration markets — small business, mission-critical automation markets and new 'enabling technology' markets, such as workstations," Hald said.

MICHAEL FITZGERALD

Continued from page 124

Some Computerland customers see the future as already here. At Procter & Gamble Co., for instance, the purchasing manager is linked directly into the Computerland computer network. This allows him to see what products are available and what is on order and plan purchasing more effectively.

Hald said that dealers must change radically in the next few years to survive. He sees Microage becoming a systems integrator that would compete with the likes of Electronic Data Systems Corp. Tauscher, meanwhile, sees efficient distribution as the key to success in the channel.

"I remember people laughing at me and saying, 'This is a marketing business, and you only know distribution,'" said Tauscher, recalling his early days at Computerland, when the giant retailer was struggling. "There was a general lack of appreciation in the industry that this was a distribution and systems game. They are awakening to that now, and it would've been harder [to return Computerland to profitability] if they had known it then."

Stuart said for years vendors have shifted inventory and receivable asset management to resellers, and resellers will begin to shift these back in 1992. This will be part of a broad move to force vendors to cooperate more closely with resellers in dealing with customers.

Compaq, stereotyped as the quintessential practitioner of dealer marketing, may serve as a bellwether. Doug Johns, vice president of worldwide corporate marketing, said, "We're not tattooed to any channel," and outlined the company's strategic shifts in marketing, in place since the early part of 1991.

Compaq sends its direct sales force into major accounts to work alongside its dealers, and it is beefing up its direct support to customers. It has also announced a strategic relationship with EDS.

Rest assured, though, that the 1990s will not see the channel resting in peace.

"Nothing is going to kill the channel," declared John Venator, executive director of ABCD: The Microcomputer Association in Schaumburg, Ill.

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Inacom: Capturing the spirit

Bill Fairfield

Some people jokingly call Inacom Corp.'s Omaha home base "The Silicorn Prairie," but management at the newly merged company pursue the computer reselling game with a straight face.

"It's a good mix," commented one executive at a major competing chain recently created by the Valcom/Inacom merger. He cited Valcom's distribution expertise and Inacom's strong end-user focus.

However, he said, Inacom's need to shift its focus more to the distribution side could cause the merged entities to stumble.

Fairfield stresses the importance of integrating the merged firms.

"Whether it's Valcom and Inacom getting together, or whether its any of the other transactions, the transaction is easy to do, but the real key issue is capturing the spirit and commitment in the business," he said.

"I don't know how big we'll be, but we'll be a major strategic player," Fairfield added about his $1 billion company. "Our goal is to be the preeminent chain, not necessarily the biggest."

MICHAEL FITZGERALD

Third-party lessors under siege as ICC marches on

BY NELL MARGOLIS
CW STAFF

WASHINGTON, D.C. — At the Computer Dealers & Lessors Association (CDLA) semiannual conference, held jointly earlier this month with the European Computer Leasing & Trading Association (Eclat), the upbeat tune of international expansion was interwoven with jarring notes of domestic contraction. Meanwhile, the independent computer leasing community continues its years-long search to find growth opportunities in a market increasingly dominated by IBM leasing subsidiary IBM Credit Corp. (ICC).

Cable News Network (CNN) war correspondent John Holliman dispatched the grim subtheme in his keynote speech. Likening "your war against IBM" to both the Persian Gulf hostilities and CNN's struggle for presence in a tough market, he noted, "You can still win if you fight harder."

However, tangible signs that CDLA might win were in scant supply.

Kenneth Pontikes, chief executive officer of Comdisco, Inc., noted in a videotaped appearance that it is costing his firm some $1 million a month to fight the lawsuit ICC slapped it with last January.

Seemingly upbeat numbers from the CDLA/Gartner Group, Inc. 1990 leasing industry survey were deflated by the news that ICC's share also grew in 1990.

Portfolio diversification — one of the independent lessor's strongest shots at growth — is continuing at a slow pace.

That message is spreading across the Atlantic, said Eclat Director-General Geoffrey Sewell. "Yesterday, IBM announced its intention to be an OEM supplier in Europe," he said. CDLA and Eclat members, he said, "have to have good trading relationships to combat that."

Bankruptcy case reveals audit limits

BY NELL MARGOLIS
CW STAFF

A computer leasing industry scandal that erupted three years ago may be about to deliver an aftershock to users and lessors. In late 1988, $1 billion-plus Continental Information Systems, Inc. (CIS), then the industry's second largest independent member, went into a financial tailspin and crashed.

Earlier this month, after an 18-month investigation, CIS bankruptcy trustee James P. Hassett filed a 263-page report with the federal bankruptcy court in New York. The document placed the blame for the company's collapse largely on the management team that recklessly drove the firm down a course of growth at any cost and on the Big Eight accounting firm that gave a clean bill of financial health to CIS as it careened toward insolvency.

"CIS did not go bankrupt because of its accounting," Hassett said earlier this month. "But its accounting practices gave its personnel the beguiling comfort of prosperity." And its auditors, acting within the letter of the rules that govern their profession, allowed users and investors to buy into the illusion.

Changes in the federal tax laws have since ended the practices that snared CIS and stymied its auditors, Touche Ross & Co. But the question of the extent to which computer leasing company auditors discover and communicate anything of value to the users and investors who rely on them is very much alive, Hassett said.

"My own belief is that it is almost impossible to pick up an accountant's report on a computer leasing company and fathom it," he said.

Hassett emphasized that accountants are not to be faulted for failing to understand the complex computer leasing business. However, he said, auditors are to be faulted — and feared — if they package their ignorance into purportedly informed statements that misrepresent the company's financial condition to users and investors.

For lessees whose need to distinguish between stable and shaky lessors has been heightened by financial turmoil in the computer leasing sector, those are likely to be discouraging words. That uncertainty may also drive more lessees into the safe arms of IBM's leasing subsidiary, IBM Credit Corp. (ICC).

"For years, ICC has been capitalizing on the perception that it's risky to deal with independents compared with IBM," said Mark Arvin, chief financial officer at Deerfield, Ill.-based Meridian Leasing Corp.

Audit reports hold out to users the promise of an unbiased, informed opinion as to a firm's financial viability, he said. "If [users] begin to feel that an auditor's seal of approval on an independent lessor might be meaningless, they're going to conclude that ICC is right," he added. "Something like [Hassett's report] absolutely does drive people into the arms of ICC."

Arvin, an accountant who formerly practiced with a Big Eight firm and now chairs the accounting committee of the Computer Dealers & Lessors Association, has seen the issue from both sides of the desk. "I've got to agree with [Hassett]," he said. "Leasing is esoteric. Computers are esoteric. The financial statements of computer leasing companies are not very intelligible to anyone outside the industry."

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Better service beats the Q3 bottom-line blues

"Find out what they like and how they like it — and let 'em have it just that way."
— Thomas "Fats" Waller

BY NELL MARGOLIS
CW STAFF

Jazz great Fats Waller never saw the recession-ridden, hotly contested computer industry of mid-1991, but he may have written the guide to growth in it.

As computer firms posted third-quarter earnings last week, serving customers a la Waller once again — as in the several consecutive preceding quarters — proved the most consistent key to healthy bottom lines. This held true in both sector-to-sector and company-to-company comparisons.

Witness, for instance, systems integration. For months, industry analysts and consultants have joined their voices in the message that many users crave new technology a lot less than they need strategic advice and products that will let them profitably deploy the hardware and software they already own.

Systems integration and outsourcing giant Electronic Data Systems Corp. will post its third-quarter earnings today. The firm's stock soared to an all-time high last week, largely on expectations of another in a long string of double-digit growth quarters for EDS.

Andersen Consulting does not publish quarterly figures. Nonetheless, the firm attributed its 20% revenue increase for the year ended Aug. 31 to relatively steady growth in all four quarters, Andersen partner A. George Battle said.

Strength in software

Another industry sector widely credited for its ability to give users what they want, how and when they want it, personal computer software is making a predicted strong showing, according to analysts.

Riding high in the PC software saddle, Microsoft Corp. attributed its stellar revenue and profit gains to the Waller principle. Strapping sales increases logged in the firm's domestic operations, both retail and through OEM channels, resulted from "strong demand for MS-DOS 5.0 as well as continued demand for Windows 3.0 and applications for the Windows 3.0 environment," Chief Financial Officer Frank Gaudette said.

Lotus Development Corp. spent the past three quarters paying in depressed revenue for its failure to ship on time a much demanded new version of its flagship 1-2-3 spreadsheet. The summer quarter saw Lotus make good on its promise of a Windows-worthy 1-2-3, with cut-price upgrades for the patient installed base.

Analysts predicted steep sales and profit increases for the Cambridge, Mass.-based software maker and saw their estimates met and surpassed.

The Waller rule was also at work in the storage niche during the third quarter: Workstations and network servers need storage; Exabyte Corp.'s high-capacity 8mm cartridge tape subsystems provide it. The Boulder, Colo.-based firm watched its bottom line swell accordingly.

Unfortunately, other well-worn trends — in particular, the ravages of the U.S. recession and the spread of economic hard times across Europe — were also evident last quarter.

Worldwide economic woes, coupled with "severe price erosion caused by overcapacity in certain product lines," clipped the wings of highflier Conner Peripherals, Inc., according to Chief Executive Officer Finis Conner.

With no immediate abatement of either the recession or the overstock in sight, Conner said, the firm is planning to cut its work force by 8%, call a hiring freeze, institute "plant holidays" to curb production and speed up a scheduled move from Singapore to Malaysia to take advantage of more cost-effective manufacturing conditions.

Third-quarter earnings 1991

Once again, the road to quarterly sweet spots for computer industry firms was paved with customer satisfaction

Company	Revenue June to Sept. 1991	Percent change from 1990	Profit June to Sept. 1991	Percent change from 1990
Computer Task Group	$70M	19%	$0.8M	(50)%
Automatic Data Processing, Inc.	$429M	4%	$45.8M	10%
Exabyte Corp.	$58.6M	49%	$8.6M	41%
Conner Peripherals	$394.7M	4%	$17.4M	(57)%
Iomega Corp.	$37.2M	19%	$4.2M	17%
Lotus Development Corp.	$218.8M	37%	$21.5M	151%
Advanced Micro Devices	$296M	14%	$17.2M	—
Microsoft Corp.	$580.5M	57%	$144M	64%
Concurrent Computer Corp.[1]	$62.1M	2%	$(27.5M)	—
Adobe Systems, Inc.	$57.2M	34%	$12.8M	28%
Motorola, Inc.	$2.75B	2%	$93M	(9)%

Parentheses indicate a reduction or loss. [1] Loss reflects nonrecurring extraordinary items.

CW Chart: Michael Siggins

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Electronics industry fears for solder

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The electronics industry is worried about the future of one of its most mundane materials: solder.

An alloy of tin and lead that dates back to the Roman empire, solder is now used mostly to make electrical connections on printed circuit boards.

The threat to solder comes from the possibility that the U.S. government's campaign against lead poisoning may wind up regulating lead out of existence, according to Jim Clum, professor of mechanical engineering at the State University of New York at Binghamton.

That could dramatically increase industry costs because substitutes for the common tin-lead solder will be more expensive by a factor of 10, Clum said, and may require retooling of electronics factories.

Desirable qualities

The electronics industry considers solder to be a nearly perfect material for its uses: It is highly conductive, strong and reliable. It is also cheap, at $10 per kilogram. Solder creates a rapid bond before the components slip out of place, and it has a melting point low enough that components and plastic boards are not damaged or warped.

So far, the government has targeted gasoline and household paints in its campaign to reduce lead exposure. Pressing further, the U.S. Environmental Protection Agency announced in May a "comprehensive review" of lead exposure and ways to regulate it.

The Electronic Industries Association, concerned about the prospect of regulation, filed written comments at the agency in August. The group argued that the use of lead in the electronics industry is well-controlled and cannot be eliminated because there are no cost-effective substitutes.

Clum said the primary health concern is for factory workers exposed to lead fumes from the soldering process. Large-scale manufacturing operations with automated soldering machines probably have adequate environmental controls, but that may not be true for hand-soldering stations, he said.

For microcomputer users who occasionally handle a circuit board, there is no danger, Clum added.

"Unless you keep licking your fingers and rubbing them over the solder joints, 24 hours a day, your exposure is virtually nil," he said.

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EXECUTIVE CORNER

Fujitsu unit names chairman

Fujitsu America, Inc., the U.S. subsidiary of Japanese giant **Fujitsu Ltd.**, has named **Norman Petersen**, 60, as chairman of its new Fujitsu Computer Products of America (FCPA) unit. **Lewis Frauenfelder** is the unit's president and chief executive officer. Frauenfelder, 51, founded Intellistor, a storage devices firm that was sold to Fujitsu in 1987.

Hitachi Data Systems Corp. (HDS) named **James Balassone**, formerly HDS executive vice president of marketing, as executive vice president and general manager of its newly created U.S.-based world sales and service organization, **HDS International**, which covers North America, Canada, Asia and Latin America. Before joining HDS, Balassone worked at IBM for 24 years. The firm also named **Brian Walker**, formerly senior vice president and general manager of HDS Europe, to the new post of executive vice president. HDS Europe covers computer sales in Europe, the Middle East and Africa. Before joining HDS corporate predecessor **National Advanced Systems** in 1986, Walker had worked for IBM Europe for 18 years. Both Balassone and Walker will continue to report to HDS CEO **Gary Moore**.

DuWayne J. Peterson has been appointed to the board of **PRT Corp. of America**. Recently retired from **Merrill Lynch & Co.** after five years as executive vice president of operations, systems and telecommunications, Peterson is now continuing his involvement in information technology through consulting relationships and directorial activities. The New York-based consulting firm specializes in technological platform re-engineering for Fortune 1,000 companies.

Verdix Corp. recently appointed **Ralph E. Alexander** to the position of president and chief operating officer. Based in Chantilly, Va., Verdix supplies Ada software development tools and secure computer network products to government and commercial users. Alexander, who joined the firm in 1987 and most recently served as its executive vice president, replaces **E. Gary Clark**, who died this past July.

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Support: A hot line to a computer career

BY ALAN RADDING
SPECIAL TO CW

Working on a vendor support hot line can be a great place to start a computer career. There's no shortage of openings because vendors are under increasing pressure to provide quality technical support. Starting salaries aren't grand, but pay improves dramatically as you move up the support ladder.

Traditionally, vendors have sought technical aptitude, product familiarity, communications skills and telephone experience. While still desirable, that profile alone isn't enough.

Entry requirements are changing to reflect a greater emphasis on service and the increased technical complexity of products. The days when technical support people provided answers by rote have passed. "Now we really need problem solvers," says Jim McMullen, director of customer support at Lotus Development Corp. in Cambridge, Mass.

For example, once it was good enough for a technical support person at Lotus to know 1-2-3 well, McMullen says. Now, a caller's problem may have little to do with 1-2-3 itself. Instead, it may result from complications with the network or some other application, such as a database or the hardware configuration.

Vendors still prefer familiarity with their products, but that is no longer the primary requisite. Nor do you need to be a programmer, although you must understand how programs are put together, says Bob Kyle, a consultant at Romac and Associates in Bala Cynwyd, Pa.

Strong interpersonal skills are a must and, in some cases, weigh far more heavily than technical expertise.

Because callers often have serious problems and are under pressure, telephone technical support goes beyond typical service businesses in its requirements for good communications skills, patience, diplomacy, teamwork and empathy. "The reality is that some percentage of people who call have lost their cool. They are having a real crisis. Maybe their job is on the line," says Wayne Records, U.S. customer support center manager at Digital Equipment Corp. in Atlanta.

A sense of humor is a must, managers say, because the technical support person can become the target of the callers' frustration and anger. "Some of the best candidates for these jobs come out of retail or other service businesses. They like helping people and solving problems," Kyle says.

Layers of support

Most organizations have several layers of technical support: the front line staff members who field routine questions, specialists who tackle particularly difficult problems, consultants who handle the most complex situations, supervisors and managers. This provides a natural career path.

Bigger salaries come as staff members move up and become less attached to the phones. Technical support salaries start at less than $25,000 and specialists average $31,000. Top technical support consultants at leading hardware and software vendors, however, make up to $60,000.

A good person can move up to a more specialized position in 18 to 24 months, reports Don Osley, vice president of research and development at Computer Associates International, Inc. in Garden City, N.Y.

Telephone support work can also lead to good jobs in other areas. Technical training and internal systems support are two common paths, but they are not the only ones. Because technical support combines product knowledge with customer service experience and communications skills, successful technical support people can also head into sales and marketing positions.

This kind of work can also be excellent preparation for people pursuing engineering and manufacturing positions, according to Roy Sovine, vice president of service and support at Dell Computer Corp. in Austin, Texas. "Even if people are headed for the manufacturing group, we like to bring them through technical support," Sovine says. The technical support experience sensitizes employees to customer service issues, which leads them to build more user-friendly systems, he says.

> THE TECHNICAL SUPPORT experience sensitizes employees to customer service issues, which leads them to build more user-friendly systems.
>
> ROY SOVINE
> DELL COMPUTER

At CA, technical support is the first step in a well-defined career path that leads from telephone support to maintenance programming and finally into software product development. The company seeks computer science graduates, Osley says.

At other companies, the career path is more flexible. Lotus, for example, offers two career paths out of technical support: technical and managerial. The technical path leads through increasingly higher support grades to product consulting and product development. The management career path leads through two levels of supervisory roles and three levels of management.

Degrees desirable

These days, technical support organizations typically look for college degrees, reflecting the increased sophistication and opportunities in technical support. In hardware support, however, an associate technical degree or the equivalent experience is still acceptable at most places.

For example, Northgate Computer Systems, Inc. in Eden Prairie, Minn., requires a two-year technical degree or military technical support training, says Bob Penbera, vice president of technical support and service.

"For hardware, we look for tech school grads or people who have had military tech support experience," Records says. But for software support, DEC wants people with engineering or computer science degrees, he says.

Radding is a free-lance writer based in Newton, Mass.

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James Lawler

Part-time teaching offers IS pros an outlet

Everyone experiences some feelings of stagnation during their careers, but this is a time when many information systems professionals are likely to be feeling particularly stymied. Raises are scant, promotions are few, and IS restructurings are par for the course.

If any or all of these symptoms are making you feel dead-ended, you might want to consider part-time teaching as an outlet for your talents. Serving as an instructor for professionals in-the-making at local colleges and universities can provide some much needed stimulation and satisfaction.

I've been an adjunct professor at Pace University in New York for eight years and find that the job is a natural fit for me in terms of my experience and qualifications. Furthermore, I find preparing students for a successful professional career to be extremely rewarding.

IS professionals — especially those with 15 or more years of experience — are in a strong position to share their industry and technical knowledge with IS students. Students can gain a stronger foothold in technology issues through hearing first-hand what tools companies are using and how they are using them, as well as what kinds of experiences they can expect to encounter working with end users. These are all things that they can't learn from a textbook but that you, as someone who knows the working realities, can teach them.

Be a mentor

One of the most important benefits IS professionals can offer students is mentoring. IS students — especially those approaching graduation — are full of career questions about which firms and industries offer the most opportunities, which courses will make them more marketable to IS organizations, which skills will be of the most value to them and even what kind of resume is the most effective.

Some of the students will stay in touch throughout their careers with the IS professional who helped them.

Former students frequently call me to discuss career opportunities they are considering. Sometimes, I bump into former students who tell me how they're using what I taught them years before. Such payback provides a wonderful sense of self-worth.

In addition to benefiting you and your students, part-time teaching can also benefit your firm because it can provide an opportunity to recruit top students to work either in full-time positions upon graduation or in internships. I've hired many students for IS internship programs in my department and some of them have been viewed by users as "superstars."

Additionally, IS professionals can learn from a teaching experience that what is simple to systems people is not as easily understood to nonsystems types. This kind of sensitivity to students will translate to sensitivity to the users in the IS professionals' firms.

Finally, IS professionals can strengthen ties between universities and businesses. Often, professionals are requested to sit on committees and councils with faculty and trustees on how to better prepare students for graduation. From this sort of feedback, universities may realize that they are technically behind the times and bolster their IS programs.

How to do it

If you do decide to become a part-time IS professor, here are some tips on qualifications and approaches:

- You should have an undergraduate or graduate degree, strong presentation skills and patience.
- Talk to other IS and business professionals who are teaching part time. You will be surprised who in your firm is already teaching. They may allow you to audit a class or two to review their techniques.
- Set up appointments with several deans of computer science or IS faculties at universities in your area to discuss specific speaking or teaching opportunities in the upcoming semester.
- Volunteer to be a substitute speaker. This way, you can get a sense of how you are in front of an audience — and whether you like it.
- Take it slowly. Start out by teaching one semester with a small work load. Teach first in continuing education in a high school or college; then teach the following year in a two-year community college. The next year, teach in a four-year college, working your way up to the graduate level. This way, you won't overwhelm yourself.
- Be prepared for the time commitment. IS professors generally teach courses one or two nights a week per semester, which takes roughly six hours weekly. This time excludes preparing lectures, reviewing student papers, preparing and reviewing exams as well as staying up-to-date on technology topics, which can take another two to four hours per week. You will also probably be called upon to help several students outside class time.
- Don't expect to become wealthy. IS professionals who teach are not doing it for the money. Typical salaries are about $1,500 per semester per class at the graduate level.

SERVING AS AN instructor at local colleges and universities can provide stimulation and satisfaction.

In summary, IS professionals ought to think about the satisfactions of part-time teaching. It is psychologically uplifting to those searching for an adjunct to their careers.

Lawler is a vice president of MIS at Merrill Lynch & Co. and a professor of IS at Pace University Graduate School of Business in New York.

IS managers and corporate hiring managers: If you have a career issue you'd like to write about, please mail or fax your idea to Cathy Duffy, (508) 875-8931.

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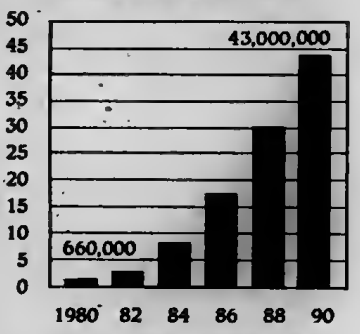

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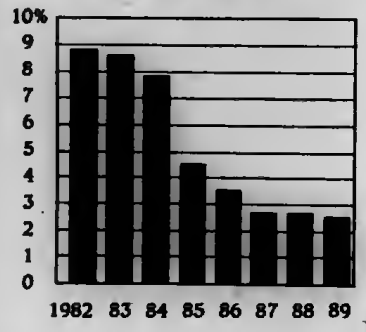

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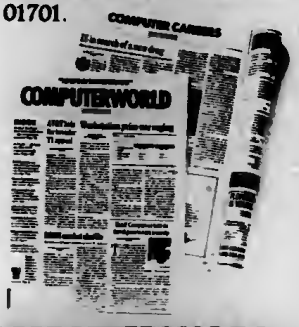

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"At TelTech we take a total solutions approach, managing all phases of a project from requirements, specifications, analysis, and design through coding, testing, implementation, and maintenance. Essentially, that means we must custom fit the skill sets of all project team-members to meet the exact requirements of over 1000 client companies worldwide. Over time, I can safely say that we look to recruit highly motivated professionals with virtually every technical and programming skill. While finding experienced data processing professionals has always been key, our rapid growth underscored an immediate need for a recruitment advertising program. We wanted a medium that would allow us to recruit the right candidates regardless of location. That one medium is *Computerworld*.

"In just a matter of months, TelTech experienced 40% growth and began rapid expansion outside New York. Clearly, we needed to find lots of qualified professionals in lots of different areas. By generating high-calibre responses from all over the country, *Computerworld's* excellent drawing power has helped expand our business into 22 states. We now maintain fully staffed branch offices in Orlando, Florida; Roswell, Georgia; Upstate New York's Hudson Valley Region; and, most recently, Denver, Colorado.

"Each of our *Computerworld* recruitment advertisements consistently produces 40 or more resumes. And, because *Computerworld* delivers quality responses targeted to the exact experience we need, virtually every one is a potential candidate. Once when we advertised for specific expertise on a brand new piece of equipment yet to be released, we even found - and hired - two candidates with that specialized skill. Our *Computerworld* recruitment advertising is also invaluable in helping establish a bank of qualified candidates for future job placements, as we generally receive resumes for months after each advertisement runs.

In anticipation of at least 100 new hires this year, we're doubling our advertising frequency in *Computerworld* to keep pace with our ever-expanding business thrust. For TelTech, *Computerworld's* far-reaching audience, dedicated readership, and long shelf life spell recruitment success."

Computerworld. It's where serious employers - like Pamela Cianci - reach qualified candidates with key computer skills. Every week. Whether you use computers, make computers, or sell products and services for computers, *Computerworld* can help you recruit the experienced professionals your business demands. For all the facts, call John Carrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

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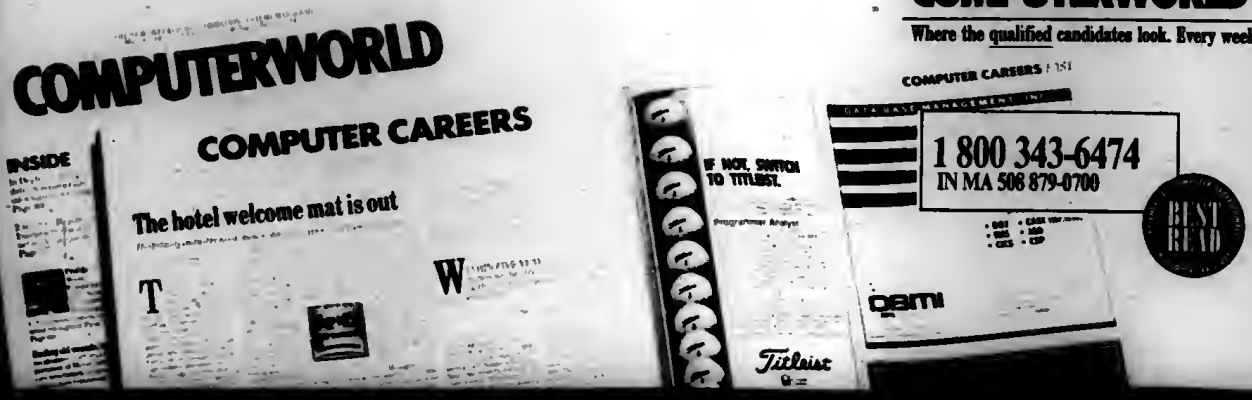

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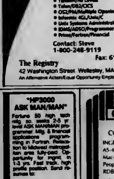

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Systems Analyst, 40 hrs/wk, 9:00am - 5:00pm, $[illegible]/yr. Systems analysis, design, development, and implementation for computer advanced business applications such as database management, scheduling and graphics. Tools: VAX and [illegible], C, Assembly, Pascal. Master of Science in Mathematics or Computer Science as well as 1 year experience as a Systems Analyst or as a Programmer required. Previous experience must include software design/development for relational database management on VAX and [illegible]. Graduate education must include [illegible] project on the design of algorithms to enhance performance. Must have proof of legal authority to work permanently in the U.S. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 3 South, Chicago, Illinois 60605, Attention: L. [illegible], Reference #V-IL-[illegible]-D. NO CALLS. AN EMPLOYER PAID AD.

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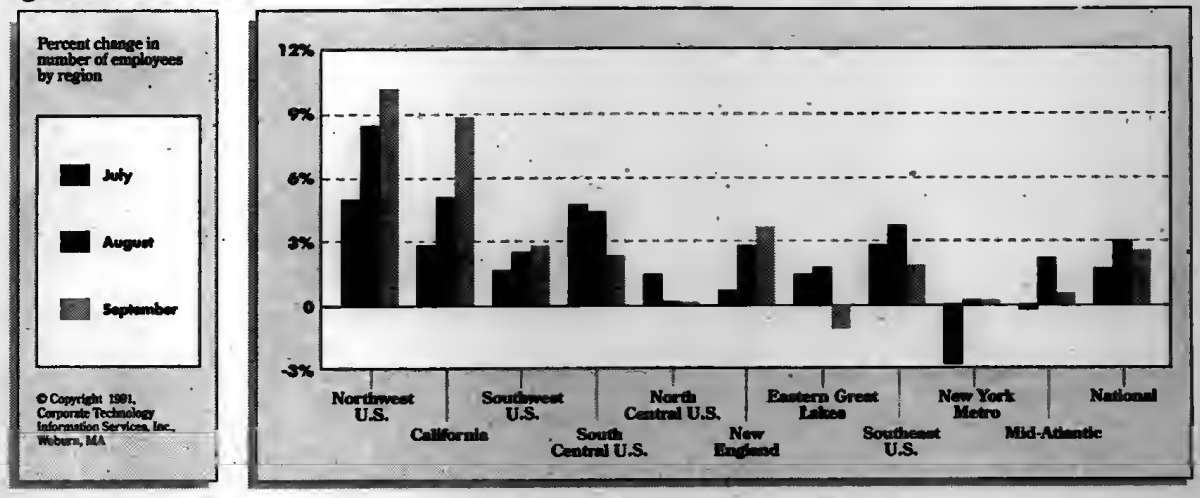

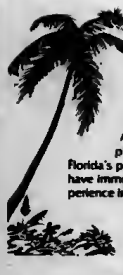

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The how-to's of getting help

Time can mean money, so get the most from your vendor's tech support

BY TONY BAER
SPECIAL TO CW

The 64K-byte question for computer systems users is, "How can we get our problems solved quickly and efficiently through vendor support lines?"

This is a more pressing question than it used to be for budget-minded personal computer users because many vendors have stopped providing unlimited support on a toll-free line.

More typical is the policy of providing free technical support for the first 90 days after purchase, then providing the user with free automated help line services that give canned answers based on user selections made by pushing the Touch-Tone buttons on a phone.

PC software vendors are also offering a variety of personalized services for a fee. Most of those services are 900 numbers, where callers pay $2 to $3 per minute to get their questions answered. Other options are flat annual rates, similar to the maintenance, support and upgrade policies customary in the data center world.

The emergence of 900 lines in the PC sector has been especially controversial because many users feel they are being forced to pay for something they deserve for free. "Do you have to pay your car dealership every time you have to go back to him with questions?" ventures Boston-area PC consultant Jim Girard.

Shop around

One good way to make sure you get the best answers at the best price is to shop with technical support in mind. In this regard, it is wise to investigate what promises a vendor is willing to make and how well it carries through on those promises.

Find out whether the vendor promises to connect callers directly. If not, get an estimate of how soon it returns calls. Then ask existing customers how well the vendor meets its promises.

Once you have made a purchase, there are a number of things you can do to ensure that you get truly useful answers to your questions. The folks on the other end of the line recommend the following: Read your manual carefully before calling us, sit by your computer when making the call, organize your questions carefully, retrace your steps as closely as possible, note all error messages and displays, never take anything for granted, and if more than one problem is involved, focus on one at a time.

Because it is often difficult to recall exactly what you have done in sequence, many technical support specialists suggest starting a call by describing the symptoms. "Don't talk about what you're doing, just describe what the problem is," advises Ann Humphrey, marketing director at the independently operated Autocad help line.

Is there a preferred time to call? The answers are mixed. Wordperfect Corp. says call volumes peak during early afternoon (eastern time), while Computer Associates International, Inc. says call volumes dip a bit then. The key isn't call volume but how adequately the vendor staffs its support lines during high-traffic periods.

Some companies are getting so frustrated with constant busy signals on the major support lines that they're turning to local consultants, resellers and systems integrators for assistance. That's the route Baxter Healthcare Corp. in Deerfield, Ill., chose, says Judy Skrabel, an in-house PC consultant. Skrabel qualifies local resellers and asks users to report support problems to her.

Automated, including fax or recorded voice messages and production information databases, help line services are one way vendors are attempting to keep lines open for truly critical calls. Phyllis Palacios, a data center computer support specialist at the Peoples Natural Gas Division of Utilicorp United, Inc. in Omaha, says she thinks users ought to make fuller use of these facilities for minor questions. In the long run, she says, being discriminating about when you call the vendor's technical support line will minimize annual support costs, especially if you pay for support as part of maintenance and upgrade packages.

When faced with a complex technical question, however, consultants and users say, don't let yourself be rushed or settle for less than the most expert answer. Girard says that if the caller doesn't understand an answer, he should repeat the question until the answer becomes clear. Similarly, Palacios says, callers should "stand up for their rights" in getting through to the correct person.

The biggest problems in getting good answers tend to occur right after a vendor has upgraded its product — there might be a time lag before its technical support staff fully understands the new release, Girard says.

Bulletin board alternative

If users don't want to deal with technical support bureaucracies or pay vendor maintenance fees, they can get answers through bulletin boards such as Compuserve and Prodigy. Vendors pay a fee to these bulletin boards to set up forums for their products. Users who are already set up on Compuserve or Prodigy pay the usual bulletin board fees. Some small vendors offer private bulletin board services, but these are generally more costly to the user, as long-distance phone charges can be involved.

The advantage of bulletin boards is that the multiple viewpoints can deliver truly original — and clever — ways around a problem. Steve Brown, controller at Ketchum Pump Co. in New York and a user of Borland International, Inc.'s Quattro Pro and Paradox, says bulletin boards are useful for getting multiple, and sometimes highly original, solutions to problems.

Baer is a free-lance writer based in New York.

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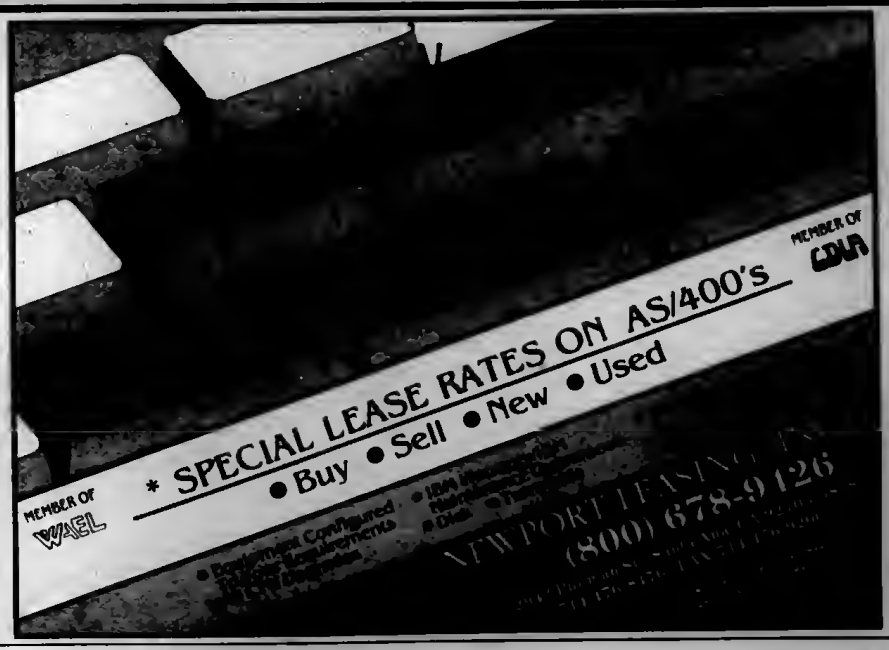

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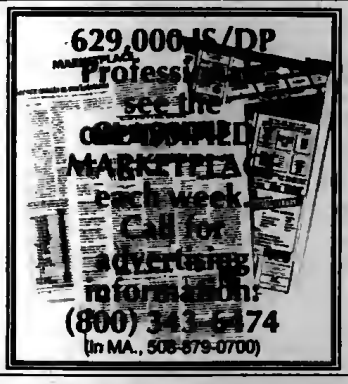

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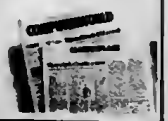

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INDUSTRY ALMANAC

INVESTMENT OUTLOOK: SEMICONDUCTORS

Chip stocks are a good buy right now while they trade at relatively low prices, said Michael Gumport, analyst at Shearson Lehman Brothers, Inc. Stocks of big semiconductor makers have nosedived an average of 36% from their April/May peaks, according to Gumport. Furthermore, subdued foreign competition makes many U.S. chip stocks appealing, he said. However, firms whose debt-to-equity ratios tilt toward debt-to-fund expansion, including **Micron Technology, Inc.**, are risky now, he warned.

Investors should also be cautious in the near term about **Chips and Technologies, Inc.**, analysts said. The firm recently introduced seven competitive new chips, including two microprocessors compatible with Intel Corp.'s 80386 chip.

However, bottom-line results are unlikely to appear before the first or second quarter of 1992, said Daniel Klesken, an analyst at Prudential Securities, Inc. To reap profits from the new products, he said, Chips and Technologies must properly execute production and maintain a good inventory balance. "Unfortunately, the company has failed in these areas, which is among the reasons for its financial difficulties" in recent quarters, he said.

Overall, semiconductor orders were disappointing in this year's third quarter, Gumport said. The Semiconductor Industry Association recently shaved its industry growth forecast for the next few years.

KIM S. NASH

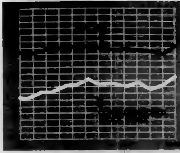
Which chips to buy?

Analysts differ on the investment potential of semiconductor stocks

Company	Prudential Securities, Inc.	
Altera Corp.	Hold	Not rated
Advanced Micro Devices, Inc.	Hold	Buy
Applied Materials, Inc.	Not rated	Buy
Avnet, Inc.	Hold	Outperform
Chips and Technologies, Inc.	Hold	Buy
Cypress Semiconductor Corp.	Hold	Not rated
Dallas Semiconductor Corp.	Not rated	Outperform
Exar Corp.	Buy	Not rated
Intel Corp.	Buy	Neutral
LSI Logic Corp.	Hold	Not rated
Micron Technology, Inc.	Hold	Buy
National Semiconductor Corp.	Buy	Neutral
Silicon Valley Group, Inc.	Hold	Outperform
Texas Instruments, Inc.	Hold	Buy
VLSI Technology, Inc.	Buy	Not rated
Xicor, Inc.	Hold	Outperform
Xilinx, Inc.	Hold	Buy

CW Chart: Michael Siggins

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- Earnings news dominated stock movement last week. IBM reported a third-quarter profit slide, but its stock gained ⅛ of a point to 99⅞. Digital Equipment Corp. said its first-quarter profits and sales improved, compared with the same period last year. DEC was steady at 56⅛.
- Among top gainers, Novell, Inc. soared 6¼ points to 45½. The company made several product announcements at last week's Networld '91 show in Dallas.
- Borland International, Inc. was unchanged at 49 after federal authorities OK'd the company's merger with Ashton-Tate Corp. Knowledgeware, Inc. reversed a three-week slide, advancing 1⅜ points to 13½. Knowledgeware shares have lost more than 36% in the past four weeks.
- Among chip companies, National Semiconductor Corp. gained ⅝ of a point to 5¼. Prudential Securities, Inc. recently upgraded the shares from hold to buy. Texas Instruments, Inc. picked up 2⅜ points to 31⅛.

Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, OCTOBER 18, 1991

TOP PERCENT GAINERS

Cambex Corp.	25.00
System Center Inc.	22.37
Intersolv	20.00
Platinum Technology	20.00
Archive Corp.	18.52

TOP PERCENT LOSERS

Goal Systems Int'l	-11.76
Information Int'l	-10.26
Computer Horizons	-10.00
Bolt, Beranek & Newman	-9.09
Microcom Inc.	-8.89

TOP DOLLAR GAINERS

Adobe Systems Inc.	8.63
Apple Computer Inc.	6.50
Stratus Computer Inc.	6.13
Cabletron Systems	5.75
Silicon Graphics	5.50

TOP DOLLAR LOSERS

AST Research Inc.	-2.13
Matsushita Electronics	-2.00
Pacific Telesis Group	-1.75
MCI Communications Corp.	-1.50
Goal Systems Int'l	-1.50

Communications and Network Services — Up 3.03%

Exch	52-Week Range			Oct 18 Close	Wk Net Change	Wk Pct Change
OTC	10.50	5.38	3COM Corp.	8.75	0.13	1.30
NYS	60.75	58.75	American Info Techs Corp.	60.38	-0.63	-1.02
NYS	40.38	29.00	AT&T	38.00	3.10	5.78
OTC	4.13	0.88	Artel Communication Corp.	1.50	-0.10	-7.69
NYS	66.25	43.00	Bell Atlantic Corp.	45.10	0.75	1.68
NYS	58.25	48.13	BellSouth Corp.	48.75	-1.38	-2.80
NYS	52.88	21.38	Cabletron Systems	51.75	5.75	12.50
OTC	25.88	8.25	Compression Labs Inc.	25.00	3.50	16.28
OTC	6.13	2.00	Data Switch Corp	2.38	0.13	5.56
NYS	21.38	8.25	Digital Comm. Assoc.	16.75	1.88	12.61
OTC	28.25	12.38	Dynatech Corp.	15.50	0.50	3.33
OTC	12.38	5.00	Fibronics Int'l Inc.	6.00	-0.25	-4.00
OTC	20.50	8.50	FileNet Corp.	20.50	1.25	6.49
OTC	3.75	2.00	Gandalf Technologies Inc.	3.25	-0.18	-5.26
NYS	3.50	1.50	General Datacomm Inds.	3.38	0.38	12.50
NYS	33.50	27.13	GTE Corp.	31.63	0.38	1.20
NYS	63.00	42.50	ITT Corp.	59.00	3.10	5.69
OTC	32.50	17.88	MCI Communications Corp	28.75	-1.63	-5.73
OTC	13.00	3.25	Microcom Inc.	10.25	-1.00	-8.89
NYS	13.75	4.50	Network Equipment Tech.	13.00	1.75	15.56
OTC	14.38	4.50	Network General	14.38	1.00	7.48
OTC	18.88	8.13	Network Systems Corp.	16.25	-0.25	-1.52
NYS	41.00	24.00	Northern Telecom Ltd.	40.88	1.38	3.48
OTC	48.50	11.13	Novell Inc.	45.50	6.25	15.92
NYS	77.63	67.00	Nynex Corp.	75.25	1.00	1.33
NYS	47.00	38.50	Pacific Telesis Group	40.88	-1.75	-4.15
OTC	11.63	3.75	Penril Data Comm. Ntwks.	8.25	0.50	6.45
OTC	38.00	8.50	PictureTel Corp.	38.00	1.75	4.83
NYS	17.88	8.88	Scientific Atlanta Inc.	13.88	0.38	2.86
NYS	67.75	46.00	Southwestern Bell Corp.	67.38	2.13	3.26
NYS	31.50	20.63	United Telecom	22.63	-0.50	-2.10
NYS	40.75	34.00	US West Inc.	38.00	-0.13	-0.36

Computer Systems — Up 3.64%

Exch	52-Week Range			Oct 18 Close	Wk Net Change	Wk Pct Change
OTC	20.75	4.50	Advanced Logic Research	10.75	1.63	17.86
ASE	17.88	10.38	Amdahl Corp.	14.25	0.50	3.64
OTC	73.25	24.25	Apple Computer Inc.	55.00	6.50	13.40
OTC	8.13	3.75	Archive Corp.	4.00	0.63	18.52
OTC	38.75	9.25	AST Research Inc.	28.63	-2.13	-6.92
NYS	9.38	4.00	Bolt, Beranek & Newman	5.00	-0.50	-9.09
NYS	21.63	8.88	Commodore Int'l	13.50	0.00	0.00
NYS	74.25	28.88	Compaq Computer Corp.	33.88	1.13	3.44
OTC	2.50	0.88	Computer Automation Inc.	1.75	0.25	16.67
NYS	13.75	6.75	Control Data Corp.	8.38	0.00	0.00
NYS	16.75	6.38	Convex Computer	12.00	1.00	9.09
NYS	44.50	23.00	Cray Research Inc.	43.00	0.63	1.50
NYS	22.38	3.50	Data General Corp.	18.88	-0.38	-1.96
NYS	4.38	1.00	Datapoint Corp.	3.50	-0.25	-6.67
OTC	38.25	8.63	Dell Computer Corp.	30.25	-1.13	-3.58
NYS	83.00	46.88	Digital Equipment Corp.	56.63	1.88	3.43
NYS	28.88	13.75	Harris Corp	24.25	2.38	10.88
NYS	56.63	34.88	Hewlett Packard Co.	50.13	3.25	6.93
NYS	139.75	94.00	IBM	99.88	0.13	0.13
OTC	13.00	7.75	Information Int'l	8.75	-1.00	-10.26
NYS	146.50	108.50	Matsushita Electronics	116.50	-2.00	-1.69
OTC	30.88	7.25	MIPS Computer Systems	9.63	0.50	5.48
NYS	110.00	44.88	NCR Corp.	108.00	0.00	0.00
OTC	29.50	10.75	Pyramid Technology	16.50	1.25	8.20
OTC	20.25	7.50	Sequent Computer Sys.	11.00	-0.75	-6.38
NYS	47.25	18.00	Silicon Graphics	43.75	5.50	14.38
NYS	44.25	17.38	Stratus Computer Inc.	44.25	6.13	16.07
OTC	38.63	18.00	Sun Microsystems Inc.	25.75	0.38	1.48
NYS	17.63	8.88	Tandem Computers Inc.	12.13	0.25	2.11
OTC	4.75	1.25	Tandon Corp.	3.00	0.09	3.15
NYS	38.50	23.88	Tandy Corp.	29.88	1.38	4.82
OTC	24.50	6.75	Teradata	22.13	0.50	2.31
NYS	6.10	1.38	Ultimate Corp.	3.75	0.00	0.00
NYS	7.00	1.75	Unisys Corp.	4.38	0.25	6.06
ASE	5.75	2.00	Wang Labs Inc. (b)	2.75	0.00	0.00

Software & DP Services — Up 4.37%

Exch	52-Week Range			Oct 18 Close	Wk Net Change	Wk Pct Change
OTC	63.00	17.00	Adobe Systems Inc.	55.63	8.63	18.42
OTC	12.25	6.50	Alcorp	5.25	-0.25	-4.55
OTC	68.88	23.13	Aldus Corp.	43.25	5.50	14.57
OTC	38.50	14.13	American Mgmt. Systems	21.00	-0.50	-2.33
OTC	17.25	8.00	American Software Inc.	10.25	1.75	20.59
NYS	4.63	1.50	Anacomp Inc.	3.25	-0.13	-3.75
OTC	18.25	11.25	Analysts Int'l	15.50	0.50	3.33
OTC	16.63	6.13	Ashton Tate	16.38	0.00	0.00
OTC	13.88	4.38	ASK Computer Sys.	12.25	1.00	8.89
NYS	38.50	24.75	Auto Data Processing	39.00	3.00	8.33
OTC	62.25	38.00	Autodesk Inc.	47.88	0.50	1.06
OTC	35.50	18.50	BGS Systems Inc.	34.25	0.00	0.00
OTC	56.00	18.18	BMC Software Inc.	53.50	0.50	0.94
OTC	16.00	8.75	Boole & Babbage Inc.	10.63	0.63	6.25
OTC	94.25	22.00	Borland Int'l	48.63	1.00	2.10
OTC	50.88	5.88	Cognos Inc.	17.25	1.88	8.88
NYS	11.13	5.63	Computer Associates	8.13	0.63	8.33
OTC	17.75	8.00	Computer Horizons	9.00	-1.00	-10.00
NYS	73.25	39.63	Computer Sciences	67.25	0.25	0.38
NYS	11.88	6.63	Computer Task Group	9.00	1.00	12.50
OTC	22.75	13.00	Comshare Inc.	18.13	-1.38	-7.08
OTC	13.25	3.75	Corporate Software	10.00	0.50	5.27
NYS	54.00	31.25	General Motors E (EDS)	54.00	0.25	0.46
OTC	16.75	7.25	Goal Systems Int'l	11.38	-1.50	-11.76
OTC	7.00	1.88	Hogan Systems Inc.	5.75	0.25	4.55
OTC	39.25	7.75	Information Resources	26.10	0.63	2.46
OTC	9.63	3.63	Informix Corp	9.50	0.25	2.70
OTC	3.63	1.88	Intellicorp Inc.	1.75	0.13	7.69
OTC	21.50	10.50	Intergraph	18.50	-0.50	-2.63
OTC	8.25	3.00	Interleaf Inc.	7.88	0.50	6.78
OTC	13.50	6.88	Intersolv	18.00	3.00	20.00
OTC	63.25	10.50	Knowledgeware Inc.	13.50	1.50	12.50
OTC	45.00	17.25	Legent Corp	35.00	1.00	3.13
OTC	40.75	14.50	Lotus Development	29.00	0.75	2.65
OTC	18.00	8.25	Mentor Graphics	13.63	0.38	2.83
OTC	32.00	8.75	Micrografx	18.25	0.88	5.17
OTC	92.25	41.25	Microsoft Corp.	90.00	0.38	0.42
NYS	15.75	4.00	On Line Software Int'l	13.75	0.00	0.00
OTC	15.13	4.88	Oracle Systems	14.13	0.13	0.89
NYS	18.00	7.50	Pansophic Systems	13.88	0.25	1.83
OTC	10.00	1.25	Phoenix Technologies	7.50	0.13	1.69
OTC	21.00	8.00	Platinum Technology	21.00	3.50	20.00
NYS	57.50	38.00	Policy Management Sys.	55.75	4.00	7.73
NYS	28.10	11.50	Reynolds & Reynolds	26.10	0.88	3.47
OTC	13.75	6.75	Ross Systems	13.25	1.25	10.42
OTC	27.50	15.50	SEI Corp.	25.00	-1.50	-5.66
OTC	23.38	13.88	Shared Medical Systems	21.25	0.38	1.80
OTC	38.25	12.00	Software Publishing Corp.	18.25	-0.25	-1.35
NYS	18.88	8.50	Sterling Software	16.88	1.13	7.14
OTC	18.25	8.50	Sungard Data Sys.	14.88	0.38	2.59
OTC	58.63	18.75	Symantec Corp	56.63	0.38	0.68
NYS	11.63	4.50	System Center Inc.	11.63	2.13	22.37
OTC	37.25	12.50	System Software Assoc.	21.75	1.00	4.82

Semiconductors — Up 5.61%

Exch	52-Week Range			Oct 18 Close	Wk Net Change	Wk Pct Change
NYS	14.25	3.75	Advanced Micro Devices	11.10	0.63	6.00
NYS	12.50	6.50	Analog Devices Inc.	7.75	0.50	6.90
OTC	13.50	5.25	Chips & Technologies	6.10	0.00	0.00
OTC	59.25	32.00	Intel Corp.	44.00	3.10	8.07
NYS	12.38	6.88	LSI Logic Corp.	8.00	0.25	3.23
NYS	18.13	8.70	Micron Technology	16.00	0.63	4.07
NYS	71.25	48.75	Motorola Inc	61.13	2.13	3.60
NYS	8.38	3.13	National Semiconductor	5.25	0.75	16.67
NYS	47.63	22.50	Texas Instruments	31.00	1.13	8.77
OTC	12.25	3.50	VLSI Technology	7.50	0.50	6.67
OTC	10.75	4.75	Weitek	7.00	1.00	16.67
ASE	8.75	2.50	Western Digital Corp.	6.00	-0.25	-4.00

Peripherals & Subsystems — Up 5.23%

Exch	52-Week Range			Oct 18 Close	Wk Net Change	Wk Pct Change
OTC	2.75	0.88	Aprius Technologies	1.44	0.06	4.55
OTC	16.75	7.50	Banctec Inc.	10.50	0.75	7.69
OTC	22.50	4.25	Cambex Corp.	22.50	4.50	25.00
ASE	11.75	4.75	Cognitronics Corp.	9.50	0.75	8.57
NYS	31.25	15.38	Conner Peripherals	16.25	-0.38	-2.26
ASE	16.88	7.00	Dataram Corp.	15.10	-0.50	-3.20
NYS	13.00	4.88	EMC Corp.	8.63	1.25	16.95
NYS	47.25	37.25	Eastman Kodak Co.	45.63	2.75	6.41
OTC	11.38	4.75	Emulex Corp.	6.88	0.38	6.25
OTC	24.50	14.00	Evans & Sutherland	17.00	0.25	1.49
OTC	7.63	3.88	Iomega Corp.	7.63	0.38	5.17
OTC	28.25	8.00	IPL Systems Inc.	18.00	-0.13	-0.69
OTC	8.25	1.63	Maxtor Corp.	5.25	0.38	7.89
OTC	16.00	6.13	Micropolis Corp	7.00	0.75	12.00
NYS	87.50	77.00	3M Corp.	83.38	0.63	0.75
OTC	10.75	6.75	Printronix Inc.	8.25	0.00	0.00
NYS	25.88	11.13	QMS Inc.	25.88	1.00	4.00
OTC	16.25	6.38	Quantum Corp	10.50	-0.13	-1.25
NYS	7.63	4.88	Recognition Equipment	7.88	0.63	8.66
OTC	11.50	4.38	Rexon Inc.	6.88	-0.25	-3.51
OTC	19.88	8.00	Seagate Technology	8.50	0.75	9.68
NYS	61.50	12.88	Storage Technology	41.88	-1.13	-2.67
NYS	30.88	14.75	Tektronix Inc.	24.50	1.88	8.67
OTC	0.53	0.18	Televideo Systems	0.28	0.03	12.40
NYS	62.10	38.00	Xerox Corp.	62.13	2.88	4.86

Leasing Companies — Up 3.06%

Exch	52-Week Range			Oct 18 Close	Wk Net Change	Wk Pct Change
OTC	18.38	7.50	Amplicon Inc.	16.50	0.38	1.84
NYS	28.38	14.75	Comdisco Inc.	22.00	1.50	7.32
OTC	15.75	8.88	LDI Corporation	14.63	0.38	2.63
OTC	4.50	2.25	Selectorm Inc.	3.25	0.00	0.00

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Apple takes aim at corporate, portable PC markets

BY JAMES DALY
CW STAFF

LAS VEGAS — Apple Computer, Inc. launched its most ambitious effort yet to grab pieces of both the critical mainstream corporate market and the sizzling portable personal computer market with today's unveiling of three notebook-size and two high-end Macintosh models, as well as an upgraded Macintosh Classic.

The Comdex/Fall '91 introductions, which Chairman John Sculley has described as "among the most important" in Apple's 14-year history, contain the firm's first solid entry into the lucrative portable market. The sleek, ergonomically designed Powerbook line is a far cry from Apple's current mobile PC, the clunky 16-pound Macintosh Portable.

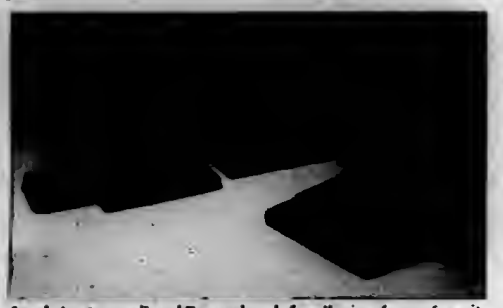
The Powerbooks, which include an entry-level model co-designed with Sony Corp., could also ride a market train that is just pulling out of the station. Notebook sales are expected to grow dramatically in the next few years and are expected to make up 51% of the nearly 5 million mobile PCs projected to ship in 1995, according to Norwalk, Conn.-based research firm Inteco Corp.

Apple's current mobile offering, the Macintosh Portable, has so far been berated by users for its 16-pound weight and hefty price tag that starts at $4,200.

Sculley has acknowledged that Apple "missed the boat" in portable PCs but has vowed not to repeat the mistake with the notebook offerings.

Analysts lauded the new notebooks but said pent-up demand for a truly portable Macintosh could quickly outstrip supply, creating shortages like those incurred after the introduction last fall of the immensely popular Macintosh Classic.

"All of the people who spent the last two years lugging around a Mac Portable are going to jump on these machines," said Ben Rose, a senior PC analyst at Technology Investment Strategies Corp. in Framingham, Mass. Apple officials said they expect the Powerbooks to be available in limited quantities until early next year.



Apple's streamlined Powerbook family *is a far cry from its clunky Macintosh Portable*

Ripened apples

Apple expands its Macintosh line from top to bottom

	CPU	RAM	Hard disk	Price range	Weight
Powerbook 100	16-MHz 68000	2M bytes to 8M bytes	20M bytes	$2,299 to $2,499	5.1 pounds
Powerbook 140	16-MHz 68030	2M bytes to 8M bytes	20M bytes or 40M bytes	$2,899 to $3,499	6.8 pounds
Powerbook 170	25-MHz 68030*	4M bytes to 8M bytes	40M bytes	$4,599	6.8 pounds
Classic II	16-MHz 68030	2M bytes to 10M bytes	40M bytes or 80M bytes	$1,899 to $2,399	—
Quadra 900	25-MHz 68040	4M bytes to 64M bytes	160M bytes	$8,499	—
Quadra 700	25-MHz 68040	4M bytes to 20M bytes	80M bytes or 160M bytes	$6,399	—

* With math coprocessor

Source: Apple Computer, Inc.

CW Chart: Michael Siggins

Quadra's central role

Although the three Powerbooks and a souped-up $1,899 Macintosh Classic running Motorola, Inc.'s 68030 chip should garner most of the limelight, the arrival of the high-end Quadra 700 and Quadra 900 could prove to be more important in Apple's corporate campaign.

The Quadra rollouts will also play into Apple's move to push the so-called client/server computing model. Although Apple computers share information with non-Apple systems as readily as other brands of desktop systems, its lack of a common processor, operating system and applications have presented difficult hurdles for information systems managers planning large networks.

Both the desktop Quadra 700 and the tower model Quadra 900 will be the first Macintoshes to use Motorola's speedy 25-MHz 68040 microprocessor. Apple users said the Quadra 900, in particular, could go a long way toward simplifying their jobs. "Negotiating the file system in our Mac-to-VAX environment can be very, very tricky, but those problems should be ironed out if we're using Quadra as a server," said Art Masson, director of transportation system development at CSX Technology, a division of Jacksonville, Fla.-based CSX Transportation, Inc.

Others said that while the server machine is welcome, they might not take the bait until more powerful database and file-server software is available.

The Macintosh Quadra 900 was designed to serve as a hub for a PC network and includes an internally configurable hard drive, significant expansion capabilities and tampering safeguards.

The three notebook models will include the low-end Powerbook 100. Built by Sony, it weighs just over 5 pounds and is powered by a 16-MHz Motorola 68000 chip.

More performance muscle will be supplied by the Apple-built Powerbook 140 and Powerbook 170, which will be powered by 16-MHz and 25-MHz Motorola 68030 processors, respectively.

The three Powerbooks will use sealed lead/acid or Nicad batteries providing two to four hours of operation. All three provide a backlit LCD.

This year's notebook entries rely on scarce 386SLs

BY MICHAEL FITZGERALD
CW STAFF

LAS VEGAS — Users may get a sense of deja vu from the notebook introductions slated for Comdex/Fall '91.

Last year, scores of vendors showed notebook computers based on Intel Corp.'s low-power 80386SX chip, but they could not ship for months afterward, largely because hard drives and screens were hard to come by. This year they will be showing products based on Intel's 80386SL, a scarce commodity as well.

"Comdex is becoming more like the candy store — you can see all the goodies, but you can't always take 'em home," said Dan Ness Jr., a microcomputer analyst at Computer Intelligence/Infocorp in La Jolla, Calif.

SL products will be announced by both the portable elite and the obscure. Among them are the following:

- **Zenith Data Systems'** Mastersport 386SLE, its second SL notebook. Based on the 25-MHz version of Intel's SL, the box will weigh 7 pounds and come standard with 2M bytes of random-access memory, an 85M-byte hard drive, an IBM Video Graphics Array-compatible screen and an enhanced parallel port for 8-bit notebook-to-local-area network connectivity. It will ship next month for $4,999.
- **Dell Computer Corp.'s** Dell System 325NC, a color notebook based on the 25-MHz SL (see story at right).
- **Advanced Logic Research, Inc.'s** recently announced VIP SL, a 7-pound box based on the 25-MHz SL, with a four-hour battery life. It comes standard with 4M bytes of RAM (expandable to 16M bytes) and 40M-, 60M- or 80M-byte hard drives. The base model price will be $3,495 when it ships in the first week of January 1992.
- **Librex Computer Systems, Inc.,** a subsidiary of Japan's Nippon Steel Corp., will show its M386SL, a 7-pound, 25-MHz SL-based notebook with 4M bytes of RAM, a 60M- or 80M-byte hard disk and a three-hour battery life. It will ship in the first quarter of 1992, with a base price of $4,599.

Librex will also show its M486 notebook, based on the 33-MHz 1486DX chip. In the same box as the M386SL, the M486 will have 4M bytes of RAM, expandable to 64M bytes, and a three-hour battery life. Its base model will cost $5,599.

- **CAF Technology, Inc.,** a Taiwanese company, will introduce its Superlite 386SL/20, a 12- by 11-in. box based on the 20-MHz SL chip and weighing less than 8 pounds. With a 40M-byte hard drive and 2M bytes of RAM, it will cost $2,900.

Analysts said they do not expect the slew of 40 or so SLs announced to crimp sales of SX notebooks. "If you need a notebook and you want to buy 50 today, I don't see users putting plans on hold for [SL] technology," said Frank Michnoff, an analyst at Meta Group, Inc. in Westport, Conn.

"We aren't going to wait," agreed Muriel Foster, director of information technology planning at the New York office of Coopers & Lybrand. Coopers & Lybrand plans to equip its more than 200 auditors with SX notebooks from Safari Systems, the AT&T/Marubeni Corp. venture.

Dell notebook sports color screen, low price

BY MICHAEL FITZGERALD
CW STAFF

LAS VEGAS — Dell Computer Corp. is expected to unveil at Comdex/Fall '91 a notebook with a passive-matrix color screen that will sell for less than $5,000 when it ships in the first quarter of 1992.

"This is color for the masses," said John Dunkle, vice president of research at Workgroup Technologies, Inc. in Hampton, N.H. Dunkle said he expects Dell to price the box at about $4,500.

However, Tim Bajarin, an analyst at Santa Clara, Calif.-based market research firm Creative Strategies Research International, Inc., said users will wait for active-matrix technology.

"If I was going to buy color, I would wait. When you look at the active-matrix screens from Epson and Sharp, you'll walk away shaking your head," Bajarin said.

He added that a drawback is that the active-matrix screens, at 8½ in. to 9 in., are small. But aspect ratios and color are handled well enough to make screen size a minor issue, he said.

The Dell System 325NC is one of the first battery-powered color notebook computers announced. Based on Intel Corp.'s 25-MHz 80386SL chip, the 325NC weighs 6.9 pounds, has 4M bytes of random-access memory, a 60M- or 80M-byte hard drive and will offer up to three hours of battery life. The screen is IBM Video Graphics Array-compatible and is built on Sharp Electronics Corp.'s passive-matrix screen technology, which consumes less power than the more vivid active-matrix technology.

Lotus, Central Point swat software bugs

BY CHRISTOPHER LINDQUIST
CW STAFF

Lotus Development Corp. last week announced availability of a free maintenance release to its recently shipped 1-2-3 for Windows package, which has been plagued by reports of bugs since its release.

Similarly, Central Point Software, Inc. announced a free upgrade to its PC Tools Version 7.0 utility package. The upgrade is intended to resolve a number of problems with the software.

Lotus is shipping Version 1.0A of 1-2-3 for Windows to all registered users of the product.

The release reportedly fixes bugs and complaints related to the display, macro transcripts, compatibility with previous 1-2-3 versions and the ability to read Microsoft Corp. Excel 3.0 files.

1-2-3 for Windows user David Beckman, a partner at the law firm of Beckman and Hirsch in Burlington, Iowa, said he had already received his copy of the maintenance release. However, he said he had not experienced any problems with the product.

Bugs will not be the only hurdle facing 1-2-3 for Windows as it tries to gain market share. Microsoft recently added 1-2-3 for Windows to a list of personal computer spreadsheets targeted by the Microsoft Excel upgrade program. Users of products on that list can purchase Excel Version 3.0 for $129 if they turn in the first page of their current spreadsheet's manual.

Central Point said it will be shipping Version 7.1 of PC Tools to all registered users. Bugs reportedly fixed in this release include incompatibilities with various hardware and software, such as conflicts with some video cards, and features that did not work as documented, such as floppy disks being rejected during fixed-disk backup procedures.

Upgrades will also be sent for Central Point Commute Version 1.0 and Central Point Backup Version 7.0 to make the stand-alone products consistent with PC Tools Version 7.1, according to the firm.

To prevent similar problems with future products, Central Point said it has implemented new procedures, such as a larger number of beta testers and more in-house testing equipment.

Look

FROM PAGE 1

to gloat — Windows 3.1 will not be shipping this year either. A midyear shipping date has slid all the way to late first-quarter 1992. Beta testers polled last week were generally upbeat, describing the latest build as stable.

Also in the announced-but-not-quite-ready class are major word processing packages from both **Microsoft** and **Wordperfect**.

Both Wordperfect Version 5.1 and Word for Windows 2.0 are expected to be announced on Tuesday; they will not be ready to ship until the end of this month and early next month, respectively.

Microsoft is trying to convert a large number of the Wordperfect faithful with a heavy emphasis on file compatibility, as well as a Help for Wordperfect feature built into 2.0. Other features include Object Linking and Embedding (OLE) support, drag-and-drop text and streamlined mail-merge capabilities. Wordperfect features include a customizable button bar as well as extensive file compatibility, but the package does not support OLE with this version.

Also falling under the "so-near-yet-so-far-away" banner is a passel of pen-based computing-related announcements.

Go Corp. will host a major announcement at Comdex featuring demonstrations of pen-based hardware from a raft of vendors, including **IBM, PI Systems Corp., NCR Corp., Grid Systems Corp., Hyundai Computer Corp. and Samsung Information Systems America, Inc.**, running Go's Penpoint operating system and applications from Wordperfect and **Ink Development Corp.** [CW, Oct. 14].

Grid Systems will unveil the industry's first pen computer with integrated wireless communications capability. The GridpadRF uses spectrum radio technology to transmit data from 500 to 1,000 ft. The machine is slated to be available in the first quarter of 1992 for $2,780.

Also on the portable front will be color screens and active- and passive-matrix screens. Passive falls short of active, in terms of

COMDEX/Fall'91

both verbs and color screens, but it costs much less and will be available this year.

The Tadpole booth promises a battery-powered reduced instruction set computing notebook with a color screen on it.

As for Penpoint, it is in beta testing now; a final version is expected to ship in the first quarter of 1992.

Pen rival Microsoft will have a separate pen computing booth. **Sony Corp., Matsushita Electronic Co., Alps Electric, Inc.** and Hyundai intend to build computers based on Microsoft's Windows for Pens operating system. Six of the now 33 vendors that have announced support for Microsoft's pen-based computing system are scheduled to demonstrate new machines at Comdex this week using this technology.

Windows for Pens is expected to ship early next year, within a few weeks of Windows 3.1, a Microsoft spokesman said.

A strong multimedia bent will also be evident at the show, which will feature a separate multimedia track. Microsoft will have yet another booth devoted solely to multimedia. Three vendors — **IBM, Sony and Pioneer Communications** — will host either multimedia booth tours or briefings as well. The show floor should be peppered with a mix of video, sound and image-related add-in boards and software packages.

Hardware, as always, will be at the show in full force, ranging from the smallest disk drive (see story at right) to the first fault-tolerant PC.

The big thing at the show will be notebook computers based on **Intel Corp.**'s 386SL and **Advanced Micro Devices, Inc.**'s (AMD) AM386SXL power management chips (see story page 4). As many as 40 vendors will announce or show notebooks based on the 20-and 25-MHz versions of the SL. **Toshiba America Information Systems, Inc., Zenith Data Systems, Dell Computer Corp.** and **Advanced Logic Research, Inc.** will be prominent among these, or you could just stop by Intel's booth for a major display.

Don't hold your breath waiting for these to hit the market, though. That will take a few months.

AST Research, Inc. will lead the AMD contingent, and these boxes will be readily available, since AMD is producing already, whereas Intel is still ramping up to production levels.

Also competing in the category of showing but not shipping will be multiprocessors. **Arche Technologies, Inc.** will add its name to the list of vendors with products (joining **Everex Systems, Inc.** and **Wyse Technology, Inc.**, among others) when it shows its coming symmetric multiprocessor, based on the M/PAX chip set from Chips and Technologies, Inc. AST will also demonstrate its multiprocessor, fresh from the laboratories.

Senior Correspondent Jim Daly, Senior Writer Michael Fitzgerald and Staff Writer Carol Hildebrand contributed to this report.

COMDEX PRIMER

With legions of computer-minded folk heading for their 12th annual Vegas fix, the schedule is filling up with meetings, speeches and plans for booth-browsing. The circus this year is taking up approximately 2.2 million sq ft at five sites. Compared with the average three-bedroom house of about 2,000 sq ft, Comdex is covering a lot of real estate. Approximately 1,850 companies from 22 different countries are expected to show, with attendance predicted at around 125,000, about the same as last year's. Among the planned gatherings are these:

The keynote address, scheduled for today at 9:30 a.m., features Andrew Grove, **Intel Corp.**'s president and chief executive officer. His speech will cover steps the personal computer industry needs to take in the next 10 years to fully exploit the PC's potential as a business tool.

The keynote will kick off a series of talks by top industry CEOs. Other featured speakers will be **IBM** President Jack Kuehler on Tuesday morning, **Microsoft Corp.**'s Bill Gates on Tuesday afternoon and, rounding out the series, Philippe Kahn of **Borland International, Inc.** Wednesday morning.

■

The Micro Channel Developers Association will convene for its first annual membership meeting on Monday to discuss first-year results and second-year plans.

■

Maybe these aren't exactly strategic applications, but a look through the Comdex items coming out of left field yields some nuggets, oddities and maybe a stocking stuffer or two:

For those who make a leap for the kitchen chair at the first sign of a rodent, **Abacus, Inc.** is introducing Nomouse, a software alternative to the garden-variety mouse most Windows users are accustomed to.

If a mouse doesn't seem quite substantial enough for the holiday stocking, you can always add a disk drive. **Integral Peripherals** has a couple that fit comfortably in your hand. The 1.8-in. drives come in 20M- and 40M-byte versions.

■

Not content with cornering the batteries-not-included toy market, the "copper-top" people are training their batteries, so to speak, on computers. Yep, **Duracell, Inc.** will be on hand to make sure that we know enough about battery life.

■

How about a little brush with celebrity? **Expervision, Inc.** is dangling dreams of hanging out with Canseco and Co., getting a bit part in a television show and co-performing with an as-yet-unnamed "well-known entertainer." Just enter its "Recognizing Great Characters" contest.

■

And talk about being full of hot air — **Link Technologies** is giving it away. The terminal vendor is sponsoring a contest to win, you guessed it, free rides in its hot air balloon.

Then there are the booths for more careful folks. **Safesupplies, Inc.** is offering fire- and water-resistant portable products that protect your technology from environmental disaster. Whether the users survive is a horse of a different color.

If the prospect of flood, fire and famine doesn't wet your whistle, how about a UFO? **Microcomputer Accessories** is pushing its ergonomically correct accessories to turn your workplace into a user-friendly office. And if the Gideon in the hotel room isn't enough, **Delrina Technology, Inc.** is offering copies of what it calls the "Industry Bible on PC Faxing." David Day, author of *The PC Fax Book*, will be on hand.

■

Finally, if you can't be well-known, you might as well be loud. **Hooper International**, which bills itself as having accounting software for the average Joe, is not only setting up a bright neon booth, its staff gets to dress in "wild, funky pants and short, multicolored skirts" that match the booth.

■

Texas Microsystems, Inc. may not be the best-known Houston-based personal computer maker, but it will be the first to offer a fault-tolerant PC. Texas Micro's FTSA features a custom BIOS that retains DOS compatibility but has fault-tolerant features, such as data-mirroring and redundancy.

CAROL HILDEBRAND

NEWS SHORTS

Apple revenue up; income down

Apple Computer, Inc. last week announced that its fourth-quarter financials showed an 11% growth in revenue over the similar quarter last year, from $1.354 billion to $1.507 billion, but an 18% drop in income over the same period, from $98.5 million to $81.2 million. Apple stated that its Macintosh computer unit had grown more than 50% for the fourth quarter.

AT&T posts third-quarter loss

AT&T last week posted a $1.8 billion loss for its third quarter after taking $4.2 billion in charges for restructuring and merging its computer business with NCR Corp. AT&T, however, said it expects to post an overall profit for the year. The company said most of its gains in the third quarter came from its long-distance telephone business and financial services unit. AT&T revenue, including NCR's, was $11.04 billion, up 1.2% from the $10.91 billion recorded one year earlier.

TI patent ruling is a mixed bag

Texas Instruments, Inc. won an initial ruling by the International Trade Commission (ITC) last week in a patent infringement suit TI brought against five U.S. semiconductor companies in July 1990. The ITC prohibited Cypress Semiconductor Corp., Analog Devices, Inc., Integrated Device Technology, Inc., LSI Logic Corp. and VLSI Technology, Inc. from packaging semiconductors using a technique called "bottom-gating." Meanwhile, another technique known as "top-gating" was found not to be under TI's patent, and the ITC said the five companies can continue this practice. TI also reported a larger-than-expected third-quarter loss of $113 million, compared with a $7 million deficit reported last year. Sales for the quarter, ended Sept. 30, were $1.7 million, compared with $1.68 million in 1990's third quarter.

Mustang extends on-line reach

Mustang Software, Inc., which claims to be the largest supplier of bulletin board software, said it plans to acquire a communications package reportedly used by more than 70,000 people to connect to MCI Mail, Compuserve and other dial-up services. The Bakersfield, Calif.-based company is expected to announce this week at Comdex/Fall '91 a deal with The Forbin Project for the rights to Qmodem, which Mustang plans to bundle with Wildcat, a commercially distributed BBS.

Ameritech aids TCP/IP, Token Ring

Customers trying to manage Transmission Control Protocol/Internet Protocol and Token Ring networks under a single environment got an assist last week from Ameritech Information Systems. The Ameritech subsidiary said the product, slated to ship in mid-November, was originally designed to support the Harris Corp. internal data communications network. May and Speh, Inc., an outsourcing company in Downers Grove, Ill., said it will market the product to end users as well as offer integrated network management services.

GTE enters MAN market

A fiber-based data service for integrating voice, data and video in a metropolitan-area network was announced last week by GTE Telephone Operations, which said the service costs half that of leased-line alternatives. The multipoint service is targeting organizations that need to communicate between computer networks within the same city.

ADL exec to head DEC unit

Digital Equipment Corp. announced that S. Russel Craig will lead its Management Consulting Group in the Consulting Services Unit. Craig, who is a former vice president and director in North American Management Consulting at Arthur D. Little, Inc., is now manager of DEC's Management Information System business.

Wang users hot for migration

BY SALLY CUSACK
CW STAFF

BOSTON — Open systems migration was the unofficial theme at the annual meeting of the U.S. Society of Wang Users (USSWU) held here last week.

With a show floor crammed with third-party vendors hawking migration tools, a joint IBM/Wang Laboratories, Inc. booth and Wang officials proclaiming the IBM RISC System/6000 as their "platform of choice" for open systems migration, conference attendees had plenty to absorb.

"The thing people are coming away with is the question, 'When?' " said Matthew J. Gillman, president of USSWU. "The question is not so much one of, 'Am I going to migrate to the RS/6000?' but one of personal company economics — 'When is it right to make the move?' "

Gillman said users agree that Wang's Office 2000 strategy, forged in part from its much-publicized alliance with IBM in June, makes good sense.

Wang will port its suite of office software to the Unix-based RS/6000 platform during the next 12 months. This includes its imaging software, which will be ported in early calendar year 1992, its Pace database product and several word processing and automation packages.

While many Pace users are eagerly awaiting an RS/6000 port, there are exceptions. Jim Ord, a systems manager at John Hancock Financial Services in Boston, relies on Pace to develop and maintain the firm's mortgage investment database. At present, Ord said he is not enthusiastic about either Unix or the RS/6000.

In his keynote address, Wang President and Chief Executive Officer Richard Miller hit the VS support issue head-on, pledging support for the VS product line through upgrades, products and enhancements.

Bolstering this statement was the first-time public display of the Mercury CPU board. Mercury is the code name of the next-generation high-end VS system slated for delivery in early 1992.

The CMOS-based system has been designed with a cache size of 256K bytes and will be offered in two versions: a board-level upgrade for Wang's top-of-the-line VS 10000 and a complete new system incorporating a VS 10000 system bus and including new support components, such as System Bus Interface and Support Control Unit Boards.

According to Gillman, users seem be falling into three camps: those converting to another vendor platform, those migrating to the IBM RS/6000 and those remaining with Wang's proprietary VS midrange computing platform for an indeterminate period of time.

Building blocks

Wang's Miller

In his keynote address to USSWU attendees, Richard Miller, president and CEO of Wang, outlined four major building blocks for the company's financial stability and growth:

- Office 2000 Strategy represents a "return to Wang's roots" as a strong player in the office technology arena, focusing on work-group computing.
- The Wang/IBM alliance is expected to allow Wang to migrate value-added software applications to the Unix-based IBM RS/6000 boxes.
- Organization and cost structure. This effort includes a reorganized business strategy, reduced cost structure and a new management team, which includes both Wang veterans and new talent. The most recent appointee is Donald P. Casey as chief development officer. He was most recently vice president of Lotus Development Corp.'s Spreadsheet Division.
- Quality Leadership Process. This customer-focused retraining program is mandatory for employees worldwide.

CMA conference puts focus on ISDN

BY JOANIE M. WEXLER
CW STAFF

NEW YORK — Last week's Communications Managers Association (CMA) conference here emphasized ISDN but fell short in putting it in context with other WAN alternatives.

For example, Diane R. Miller, a senior telecommunications analyst at Beneficial Data Processing Corp. in Peapack, N.J., said she was window-shopping for a network service to support a nationwide videoconferencing network but as yet does not see how Integrated Services Digital Network would offer an advantage over other technologies.

Murray: 'Smaller staffs rely more on vendors'

The conference brought users up to date on the efforts of National ISDN-1, an industry-wide initiative that kicked in last February to ensure that all network service, switch and equipment providers standardize on a common ISDN interface.

However, the widespread education necessary to clarify for users how ISDN plays with other emerging phone company services seemed in short supply.

John W. Seazholtz, chairman of the Corporation for Open Systems ISDN Executive Committee, outlined ambitious phone company ISDN deployment plans in a general session. However, when questioned, he did not address how ISDN handled applications better than other technologies.

Seazholtz also would not discuss ISDN pricing issues, which some users said could be a differentiating factor among technology choices.

However, Nynex Corp., one of the major regional Bell operating companies in the Northeast that recently tariffed ISDN, said any user with digital Centrex service can overlay Basic Rate Interface (144K bit/sec.) ISDN service for $18 per month in addition to the existing $15 to $20 per-line charge.

"Buying ISDN service for videoconferencing instead of two switched 56K bit/sec. lines costs less than half," Nynex associate director Robert Block said.

The ISDN theme played into what CMA President Charles Murray said was at the forefront of most show attendees' minds: staying employed in light of mergers, acquisitions and downsizing efforts. "Smaller staffs rely more on their vendors," Murray said, and "ISDN is the kind of service where the vendor looks at your business and advises you on how to apply it."

OS/2

FROM PAGE 1

iority over Windows 3.0 leaves them little choice but to wait. Developing applications in Windows, Holmes said, is similar to "having a little ticking bomb waiting to create trouble for support and users."

Still, patience is running thin.

At Cotter & Co., a buying cooperative in Chicago, Dave Arthurs has been waiting for Version 2.0 to appear before making an upgrade decision slated for mid-1992. "We were hoping for a copy in first-quarter '92," he said. Any further delays could completely cut OS/2 off the checklist.

"OS/2 is dead," one information systems director said. He, like some other early OS/2 users, had moved over to Windows 3.0 while awaiting what many consider to be the real OS/2, Release 2.0. These users are critical to both IBM and Microsoft because they will likely wait to see Microsoft's New Technology Windows before making their 32-bit processing selection.

The delay is attributed to efforts to pull together all of the fixes and added functionality requested by more than 20,000 beta and early program testers, Guglielmi said.

"We could have taken the easy decision, which would have been the wrong decision and the classic one we'd have done in the past — to ship reduced functionality to ensure lower risk," Reiswig said. The harder decision, he explained, was to wait a few months to add what IBM knew users wanted rather than making them wait 18 months for Release 2.1.

The two executives bristled at industry suggestions that IBM has blown its window of opportunity with OS/2. Some suggested that the timing could not be worse. The OS/2 delay follows on the heels of IBM's confirmation that it will shut down its independent desktop software unit in Stamford, Conn. Further news about the demise of the lame duck software group could come this week, IBM said.

It also coincides with reports that Microsoft will ship the software developer's kit for its rival 32-bit environment, New Windows Technology, by year's end.

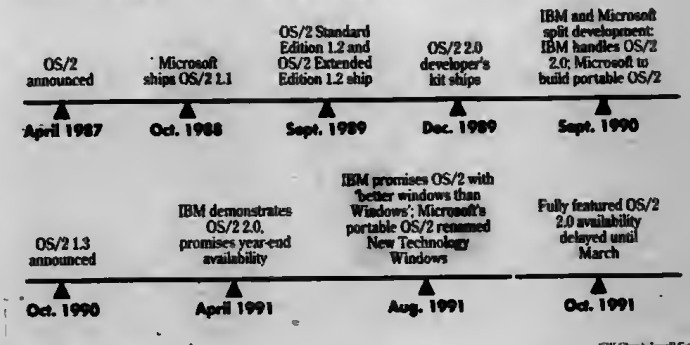
For some, the sin lies not in being late to market but rather in the very public commitment IBM made to ship by year's end.

"I don't think three months one way or another makes much difference, but IBM should never have hung a date out last spring," said consultant Amy Wohl at Wohl Associates in Bala Cynwyd, Pa. If the company gets egg on its face in March, she said, "it's death wish time."

IBM executives will repeat their rationale for delaying OS/2 at a briefing later this afternoon at Comdex/Fall '91 here. They will highlight the following:

- Commitments from 500 independent software developers to deliver 710 32-bit OS/2 applications in 1992. Developers interviewed last week reaffirmed their support for OS/2 2.0, but many conceded that getting Windows applications out is the priority now.
- Version 167 of the beta-test version of OS/2 2.0 went out last week; it contains all of the functions demonstrated in April, including Windows applications in full-screen mode, the Workplace Shell function and network support.
- Vastly expanded and creative distribution as well as aggressive price cuts and significant OEM support.
- Improvements in the Workplace Shell, which also went out last week, sources said.
- Details about the March release, said to include seamless Windows; added local-area network support, including a 32-bit LAN engine; the Workbench Manager, an improved file manager; and a repackaging of the Extended Services components.

A long strange trip: *Milestones and stumbling blocks in the checkered history of OS/2*



CW Chart: Janell Genovese

HP rolls out entry-level color ink-jet printer

BY J. A. SAVAGE
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. last week introduced a plain-paper, color ink-jet printer priced well below a monochrome laser printer.

Ink-jet printers comparable in quality to laser printers are making impressive inroads into the low-speed, high-quality printer market as personal printers. Users who do not want to share printers or users with specific color needs on a budget appear ripe for such peripherals.

"HP just created a new market," said Marc Boer, an analyst at BIS Strategic Decisions in Norwell, Mass.

The Deskjet 500C printer is listed at $1,095, and a monochrome Inkjet is $599. HP's lowest priced laser printer is the Laserjet IIP Plus at $1,249.

Darryl Gordon, computer education supervisor at The Advertising Arts College in San Diego, is sold on the plain-paper aspect and low price of ink jets for his 300 students. "They print nonstop," he said.

Both laser and ink-jet printers have a resolution of 300 dot/in. A color ink-jet page takes about four minutes to print. HP Laserjet runs about four pages per minute and is only available in monochrome.

Deskjet is IBM-compatible and joins an Apple Computer, Inc. Macintosh-compatible ink-jet printer, the Deskwriter C, at $599. Deskjet is slated for delivery in mid-November.

Networld

FROM PAGE 1

other major vendors, generally through partnerships.

Networld attendees emphasized that while third-party products and systems integrators have been filling in crucial areas of multivendor integration, vendor alliances like those showcased at the Networld '91 show promise to be far less costly and more dependable — particularly if the alliances offer cooperative support of multivendor installations.

"Any time you mention a third party, it means extra money not included in the original system," said Brian Sitton, computer systems manager at Baylor University's engineering and computer science departments in Waco, Texas.

The most popular ally at the show was Apple Computer, Inc. Microsoft, Banyan and IBM all announced plans to support Apple's networking and workstation environments on their network backbones and — in IBM's case — network management systems.

Apple and IBM also announced Apple's licensing of IBM's 4/16M bit/sec. Token Ring adapter card for the Macintosh.

"If Apple and IBM want to remain in a leadership role," said Frank Bushong, microcomputer systems manager at the Texas Department of Transportation, they must be allied.

Together, Bushong said, they offer IBM's renowned hardware and Apple's cultishly popular software. Similar sentiments were voiced about the IBM/Novell, Inc. relationship.

Combined effort

Apple also announced a nebulous technology called the Open Collaboration Environment that both companies are working to create. The technology is being billed as a standard way of linking services such as store and forward, directory and electronic signature.

Other moves toward openness announced last week included the following:

- Microsoft announced LAN Manager 2.1, support for the Transmission Control Protocol/Internet Protocol and the ability for LAN Manager clients to access Novell's Netware.
- Banyan announced a file system that is said to allow file sharing across OS/2, DOS, Macintosh and Windows clients.
- Novell and Sun Microsystems, Inc. subsidiary Sunconnect announced Netware Sunlink, which is said to allow Netware clients and users to access file and print services on a Solaris workstation.

The big players and their allies still have a long way to go before fully addressing the complex administration and management needs of big corporate networks, users agreed.

"I have three people working on virus prevention; I wish the vendors would just get together" and come up with a consistent solution, Bond said.

"When you [can] get Novell and Compaq together [at a site] with no finger-pointing, then you've really got something," said Donald Sternfeld, director of IS at New York law firm Morgan, Lewis and Bockius.

Users were particularly critical of vendors' inability to provide integrated local-area network management products with the features they need. This leaves plenty of room for third-party management products, which were in strong evidence at Networld '91.

The U.S. Marines are evaluating several third-party management solutions for their Vines networks, according to Commander Matthew Green.

Green said the news that Banyan will provide Vines management via its recently announced partnership with Digital Communications Associates, Inc. "is good news — but we want to see rather than hear."

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TRENDS

Sales force automation

Traditionally removed from the main operation, sales teams are being drawn into the corporate fold through information technology.

Single-user lead tracking applications have dominated the market to date. However, multifunctional integrated systems are gaining acceptance.

Software applications

	Lead tracking/ Account mgmt.	Tele-marketing	Sales analysis	Integrated sales
1990	45%	18%	6%	31%
1991*	39%	18%	7%	34%
1992*	32%	18%	10%	39%
1993*	25%	17%	12%	44%

*Projected •In percentage of revenue; all figures are rounded

The move toward distributed systems has captured most markets including this one, as more sales forces begin to put their software on LANs.

Hardware platforms

	PC	LAN	Minicomputer
1990	54%	15%	31%
1991*	49%	18%	33%
1992*	43%	21%	36%
1993*	39%	22%	39%

*Projected •In percentage of revenue; all figures are rounded

Top PC-based lead tracking and management software

(Ranked by vendor U.S. revenue)

Geographic region

(In percentage of revenue)

The U.S. has taken hold of the automated sales force concept firmly, accounting for most of the revenue generated

1991 world revenue: $259.3 million

Source: Market Intelligence Research Corp., Mountain View, Calif.

CW Chart: Janell Genovese

NEXT WEEK

True distributed computing is still a pipe dream. While companies can accomplish certain distributed functions, barriers remain that prohibit data sharing and access and software development for distributed environments. Next week's In Depth explores the limits to distributed computing and what will be needed to overcome them.

Philip Anderson

Experts say integration and re-engineering are two of the hottest issues facing manufacturing operations today. For the strategies leading firms are using to keep advancing toward the goal of computer-integrated manufacturing, see Integration Strategies with front-line accounts from top firms, plus views from leading IS consultants.

INSIDE LINES

Dialing for PCs

▶ Whispers that IBM is seriously considering the mail-order channel are getting louder and have some truth to them, according to some observers. But they say IBM's idea of mail order is closer to Dell's, where telemarketing plays a significant role. These observers say to watch for an announcement in the first part of next year, depending on how well IBM is able to quell dealer backlash over IBM's decision to market its new Personal System/1 through mass merchandisers. IBM will likely feature the PS/1 and perhaps some lower end PS/2s in its direct-response marketing foray, observers say. Big Blue is also said to he considering authorizing third-party mail-order firms to resell IBM boxes.

Let's get really small

▶ Dell confirmed reports that it is working on a subnotebook but added that the product probably would not appear until the first quarter of next year. The box will weigh less than 4 pounds, Dell confirmed, but no further information was available. A source close to the company said the product would be slightly smaller than the 8½- by 11-in. notebook size, use a flash-memory card for a floppy, have no hard drive in its base configuration and cost close to $1,500.

Betting on the bottom line

▶ Rick Miller, president and chief executive officer of Wang Labs, told attendees at last week's national user conference that he is "so confident" about the company's future that he recently chose Wang stock options over his annual cash bonus. Wang quarterly results are due out this week.

Hackers' heaven

▶ If you're looking to lose yourself in cyberspace, you might head over to Phenomicon '91 on Nov. 1-3. The event, which is also billed as Anarchy in Atlanta, is aimed at science fiction fans and the sort of folks who prefer virtual reality to real life. Adam Grant and Frank Darden, two hackers who were sentenced to spend up to a year in jail and halfway houses, will be on a panel titled "What to do when the Secret Service comes knocking on your door," according to show organizers.

Messaging gets secure

▶ Beefed-up security for electronic mail is in the works amid the ongoing controversy surrounding the privacy of corporate messaging. E-mail security add-ons for TCP/IP networks are under construction by the Internet Privacy and Security Research Group and are "close" to commercial availability, according to Chairman Stephen Kent, who is also chief scientist at BBN Communications, the firm that manages the worldwide research and educational Internet. Security features include digital signatures to prevent message tampering and nonhuman, fail-safe methods of issuing passwords. Collectively called Privacy Enhanced Mail, the add-ons are already in beta testing, running across SunOS, DOS/Windows 3.0 and Macintosh operating systems. The software is based on the same key management technology as the 1988 OSI X.400 E-mail standard.

Testing, testing

▶ One user reports giving Iomega's new Bernoulli removable storage disks a lot of work: He threw an evaluation copy in his trunk and drove over bad roads, tossed it like a frisbee around his office and even put it in a drier (but didn't turn the heat on) and rattled it around for 10 minutes. The user reports that the disk survived just fine, although he's not sure Iomega will be happy with the way it looks when it gets the disk back.

Increasing numbers of computer intrusions into U.S. government computer systems are originating overseas or involve foreign nationals in the U.S., according to state and federal investigators. "There are realistic national security concerns; they are not just playing with bulletin board systems," one law enforcer said. "I have seen hackers access classified files, and I have seen hackers recruited by the Soviets," another said. Any sign of foreign intruders? Call our News Editor, Alan Alper, at (800) 343-6474, fax him at (508) 875-8931 or Compuserve him at 76537,2413.

VOICE!

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